CALIFORNIA JOURNAL
OF SECONDARY EDUCATION

Vol. 14 DECEMBER, 1939 No. 8

Safety Education

"INSTRUCTION must be given in every elementary and secondary school in the State in the subjects of public safety and accident prevention primarily devoted to avoidance of the hazards upon streets and highways." So reads an extract from the General Laws of the State of California.

Local school units, as well as the State Board of Education, have responsibilities in providing instruction in public safety. Because they realize the importance of preventing accident hazards on the streets and highways, in the elementary and secondary schools, and elsewhere, they are glad to assume this responsibility.

The placing of responsibility for safety education, however, is not enough to insure effective instruction throughout the schools. As a start towards the establishment of a satisfactory State program, therefore, an extensive study of practices in safety education, with particular reference to traffic safety on the secondary school level, was begun February 1, 1939, and will continue until February 1, 1940. This study was made possible by the transfer of funds from the division of Motor Vehicles to the University of California, these funds to be used to employ a highly qualified individual to study developments and to report findings. Ray Ingels was at that time Director of Motor Vehicles. The project was to be sponsored jointly by the University of California and the State Department of Education.

At this point it was deemed advisable to appoint a committee which would be representative of divisions of State government, of educational institutions, and of lay groups interested in and concerned about safety education. The committee, duly appointed, formulated the general plans and policies for the study and report.

The membership of the State Committee on Safety Education is as follows:

George J. Badura, principal, Fortuna Union High School, Fortuna, (representing the California secondary school principals).

Floyd P. Bailey, president, Santa Rosa Junior College, (representing the California Junior College Federation).

J. C. Beswick, chief, Bureau of Trade and Industrial Education, State Department of Education.

Mrs. P. D. Bevil, senior information clerk, State Board of Equalization.

E. Raymond Cato, chief of the Highway Patrol, State Department of Motor Vehicles.

A. J. Cloud, president, San Francisco Junior College, (representing the Western Association of Colleges and Secondary Schools).

John Compton, principal, Emerson School, Bakersfield, (representing the California elementary school principals).

Knight Dunlap, chairman, Department of Psychology, U. C. L. A., (representing the University of California).

Carl Fry, chief, Bureau of Industrial Accident Prevention, State Department of Industrial Relations.

Helen Heffernan, chief, Divisions of Elementary Education and Rural Schools, State Department of Education.

Ira C. Landis, superintendent of schools, Riverside, (representing the public school superintendents of California).

A. E. Lentz, administrative adviser, State Department of Education.

Mrs. James K. Lytle, president, California Congress of Parents and Teachers, Inc.

T. W. MacQuarrie, president, San Jose State College.

Paul Mason, chief, Division of Drivers' Licenses, State Department of Motor Vehicles.

Leonard McClintock, chief, Division of Safety Education, State Department of Motor Vehicles.

W. H. Orion, chief, Division of Physical and Health Education, State Department of Education.

J. W. Stevens, state fire marshal.

J. W. Vickrey, safety engineer, State Department of Public Works.

Aubrey A. Douglass, chief, Division of Secondary Education, State Department of Education—chairman.

The most important factor in any plan investigating an educational problem is the person who is to be responsible for the actual organization and conduct of the investigation. Fortunately for all concerned, Dr. Frank K. Foster, for several years prominently identified with safety education, was secured to conduct the present study. Dr. Foster has, since February, 1939, devoted full time to the project.

Because of the vital and increasing importance of safety education, it has received much interest and attention. Materials and methods of instruction have developed with great rapidity. Many of these are highly ingenious and well conceived and should be described and made available. This issue of the Journal is devoted to this purpose, with Dr. Foster assuming the chief responsibility for selecting the safety projects described in the pages of this publication. At a later date, the California Society of Secondary Education plans to issue also, as one of its monographs, a more complete account of practices in safety education in California.—Aubrey A. Douglass, *Managing Director; Assistant Superintendent, State Department of Education.*

Next Month

An important symposium on the place of art in general education is being prepared for the January issue of the Journal. Planning it and gathering materials is Miss Margaret H. Erdt, supervisor of art, San Bernardino. Contributors of the articles are all Southern California teachers, selected so that they could be called together by Miss Erdt to discuss the best means for handling the material to be presented.

Miss Erdt herself gives us the philosophy on which art education is based. Howard Wilson, Sturges Junior High School, San Bernardino, describes methods of meeting the art needs of children with little or no talent. Miss Margaret Brown, Beverly Hills, discusses the social aspects of an art program on the senior high school level. Miss Jean Abel, Glendale Junior College, tells of the coöperation of the art department with other divisions of the school. Archibald Wedemeyer of Pasadena Junior College discusses the breaking down of departmental lines and tells of means for coöperating with the community. Miss Edna Jones of the Susan M. Dorsey High School, Los Angeles, describes the correlation of art appreciation that can be effected by a "visiting" or consultant teacher.

Miss Shirley Poore, director of art, Long Beach, California, writes the editorial for this issue.

Among other articles in this issue is an account of progress in California under the George-Deen Act, written by J. E. McDowell, State Department of Education. Miss Ethel Spearman, Sanger Union High School, after a tour abroad, gives her impressions of the manner in which Nazi Germany has set education to serve its purposes. Carl Tanke and C. O. Blayney of the Selma Union High School describe a meeting of the Ideals Conference, a youth meeting held annually in Madera, Fresno, and Kings counties.

A State Program of Safety Education

By FRANK K. FOSTER

RECENT years have witnessed a gradual, but positive, adaptation of purposes in our public secondary schools to the needs arising out of social and economic changes. Traditional patterns for the direction of individual and group growth have been modified by "utilitarian" and "functional" demands. The quantity of needs has been multiplied by the complex increments in individual responsibility, and the quality of performance in the satisfaction of this responsibility has challenged education. Among the most pressing of these present-day needs which are making demands on education is the basic struggle for the conservation of life and property. The annual sacrifice of persons and property to the gods of ignorance and carelessness has assumed such proportions that dormant indifference has flared into active prevention.

Existence of a virulent and communicable disease sends the medical genius on a search for the "bug" in the dilemma. The potency of accidents as destructive forces is not less real than the most dreaded disease; and, as in all diseases, it is necessary to look for the causes of accidents if we are to reduce the number of accidents. Scientific search of the causes of accidents tends to incriminate the human element. Action directed by ignorance, faulty habit, inadequate skill, and irresponsible attitude has been charged with responsibility for cause. The fundamental nature of these elements of human conduct as factors in the purposes and processes of education warrants an

This symposium on safety education was planned by Dr. Frank K. Foster of the University of California at Los Angeles and prepared under his direction. Since he has been representing the California State Department of Education in the coördination of California's efforts in the field of safety education, he is particularly well fitted to select materials that give an adequate picture of what the various agencies in this field are doing.

The symposium is introduced by an editorial from Dr. Aubrey A. Douglass, outlining the nature of the State's program. First article in the symposium is Dr. Foster's description of the premises on which a state program should be based. Then Miss Emma M. Baumgardner describes the safety education program of the Tracy Union High School, a valuable contribution because Tracy is one of the State's experimental schools in this field and also because the school is not a large one. Edwin D. Fletcher shows what the schools can do to lower traffic dangers by educating those who are "born to crash." Chief E. Raymond Cato shows how the California Highway Patrol is coöperating with the schools. Clifford C. Scott describes the safety program in effect in the shops of the Kern County Union High School, Bakersfield. Charles W. Bahme tells of the responsibilities in regard to fire which the law imposes on teachers. Newman C. Borden, mathematics teacher in Beverly Hills High School, presents a series of algebra problems which illustrate how safety education can be tied in with the regular curriculum. C. C. Trillingham tells of the program developed by the secondary schools of Los Angeles County.

evaluation of the relationship between accidents and education.

MISCONCEPTIONS exist concerning the nature, scope, intent, and values of safety instruction. Grade placement, curricular organization, and instructional procedure have been bothersome elements among teachers and administrators. The crowded curriculum has been a convenient argument for the dismissal of safety instruction. Lack of trained teachers in safety instruction and the absence of organized instructional content have dissipated interest and initiative. But careful analysis of these inhibitive factors reveals no rational justification for the indirection of safety education. These mechanistic factors in school administration will be adjusted easily when the values of safety instruction are understood.

The processes of education are concerned with the translation of values into individual and group action. The ingredients of educational growth are applied in the form of knowledge, skills, habits, or attitudes in varied combinations. Knowledge in itself cannot give us the desired outcomes of education. The learning of every known fact about fire, for instance, is not enough. Habits in the use of fire for various purposes under varying conditions must be established, and the knowledge and the habit must be tied to skill in the use of fire. But the knowledge, habit, and skill contribute little unless the individual possesses an attitude of judgment in the use of fire. This judgment must be tempered by his respect for his personal well-being and proper regard for public welfare.

Every subject and every activity in the public schools involves specific elements that support safe performance. If we concede that effort should be directed toward the discovery of the learning elements which control safe, sane, and efficient conduct, and if we remember that these learning elements must eventuate in desirable attitudes, then the problem, rather than being one of the creation of separate classes, largely becomes one of critical analysis of the safety elements in every learning situation in relation to the determined safety needs of the individual and the group.

To illustrate: Stated purposes for a course in homemaking probably will relate to all of the general objectives of education. The making of a garment is a selected activity with inherent values to be realized through the instructional process. Specific goals are stated for the learning situation in making the garment. The doing processes would require numerous skill activities of pinning, cutting, sewing, and pressing. Each process would entail many manipulative items, and here is a place where safety education can be taught functionally.

When pinning the pattern to the

In this article Dr. Foster outlines for us the premises on which a state program of safety education is based. Of course he is speaking specifically of the California program, for we can see throughout his contribution the picture of what he and his associates have been accomplishing during the past year. Particularly in his contention that safety instruction must eventuate in attitudes rather than in memorized facts and in his insistence that no state-imposed uniform course of study in safety education is desirable do we see similarity to the policy which he has put into force.

Dr. Foster, associate in education at the University of California in Los Angeles, represents the State Department of Education in the field of safety education—his relationship to the State Department is made clear in the current editorial by Dr. Aubrey A. Douglass.

goods, the instructor or student must utilize a proper receptacle for the pins instead of holding them. Skillful use of the shears to avoid injury should be habituated. Returning the shears to a safe position when not in use should be taught, for too often the shears are knocked from the table or gathered up with the goods and perforation of foot or limb results. And there are likely to be other needs for safety practices. Failure to remove all pins from the goods may cause accidental sticking and possible infection. Scratches on face or eyes may result from pins in goods during the fitting process. Hand and machine sewing require several definite skills if there is to be safe and efficient performance. Pressing involves precautions to avoid burns, and careless use of pressing irons may result in crushed feet from a falling iron. Many fires are started from overheated irons.

These items represent some of the fundamental elements in one learning situation. Unless the essential knowledge, habits, skills, and attitudes relative to safe and efficient performance are established, the learning purposes in this particular situation may be defeated. For of what value is achievement in any field when carelessness may destroy the opportunity of the individual to enjoy the fruits of his endeavor?

This illustration has parallels in every learning situation. Critical analysis of the structure, processes, and purposes of the entire school organization will reveal the presence of natural and inherent elements that constitute this thing we call "safety education."

Thus we can readily observe that administrative factors of program time, crowded curriculum, content, and grade placement need not influence the safety offering. Provision for safety instruction merely means an *awareness* of the essential safety factors in the present program of the school. The method is *integration*—but here is not the forced affinity which, so often, carries the banner of integration.

Constant, continuous, and cumulative safety experience is only a natural part of all education, although, of course, provisions for safety needs through separate courses, special safety days, occasional auditorium programs, short units on safety in a specific year of social studies, and a variety of other incidental approaches serve an educational function. The degree of effectiveness of these incidental approaches, however, may be questioned, for too often they are planned with an absence of any clearly defined purpose.

FORTUNATELY, curriculum procedures have altered the approach to the organization of subjects for instructional purposes. In the place of depending on state-wide courses of study, local schools now assume the responsibility for the construction of their offerings. This practice is based upon the rational assumption that the school organization should reflect the needs of the community which it serves. The type of English instruction in one school might not be appropriate in another school as one of the schools might be populated largely by pupils of foreign parentage. It is equally true that any synthetic organization of safety instruction would not meet the needs of pupils from rural, urban, industrial, commercial, residential, or tenement area with equal facility. The scope of the school safety program will be largely determined by the safety needs of the school and the local community. Without a comprehensive analysis of local safety needs no school safety offering can hope to meet its responsibilities.

Little thought has been given to the extent of safety needs. Of course industry has attacked the hazards among

men and machinery, and popular interest in traffic safety has enlisted public opinion to combat the mounting tragic toll in the realm of traffic. But what of all the other areas of daily activity of mankind! Ignorance and carelessness do not confine their trade-secrets to industry and traffic alone. School safety programs must be based on analyses of the safety needs of youth in the realms of school, home, traffic, and recreation.

EVERY school presents unique features in structure and operation that require local analysis of the safety needs. Accurate records of school accidents will aid in the elimination of hazards. Every teacher of every subject and those in charge of group activities should analyze the structural and operative elements involved in the learning situations with which they are concerned to establish the essential knowledge, basic habits, appropriate skills, and protective attitudes that are inherent parts of the activity. Recently, a music teacher asked, "Where is there room for safety in teaching orchestra?" The next week a member of her orchestra pierced the cheek of another student with his violin bow because the seating arrangement did not allow adequate room for bow action. Falling music racks cause injuries. Insanitary practices in the exchange use of wind instruments are frequently ignored. Yes, safety must be practiced even in music instruction!

In spite of higher standards of safety construction in school buildings, greater protective features in equipment of buildings and grounds, and increased efficiency in administration and supervision of student conduct in school activities, the school safety problem has not been solved. Accurate figures on school accidents in California are not available, but authentic reports from national sources indicate that 44 per cent of all accidents to school children are school accidents. Nineteen per cent of all accidents to children occur in school buildings, 18 per cent on school grounds, and 7 per cent on the way to or from school. A further breakdown of these figures reveals that 31 per cent of the building accidents occur in the gymnasium, 19 per cent in halls or on stairs, 13 per cent in classrooms, 12 per cent in shops, and 25 per cent in all other building features. Certain types of playground apparatus and some types of playground activities incur greater hazard than others. The striking fact that 43 per cent of all playground accidents occur in *unorganized* play is a challenge for organization and supervision on playgrounds.

Home safety has been neglected in school instruction. The fact that moral suasion is the primary implement of enforcement of safe home conditions creates a difficult task. This dependence upon individual responsibility to maintain a safe home places a distinct charge on education.

If the writer recalls correctly, one of the basic purposes of education is *worthy home membership*. Can our educational efforts toward this outcome be justified if we ignore home hazards, insanitary conditions, and dangerous conduct that follow from ignorance, carelessness, and indifference? Falls, fires, burns, explosions, suffocations, poisonings, cuts and bruises, and electrocutions in the home exacted a greater toll last year than the toll from traffic. Each school and community should ascertain the causes of home accidents in the environs and educate the citizenry in the prevention of accidental losses of life and property. Certain regions in California have many farm-home problems. Where students reside on farms the unique features of farm residence and farm activities invite special consideration of the safety problems of the farm.

Traffic safety for secondary schools has received increasing emphasis. The importance of the automobile becomes a vital issue because the legal permissive driving age arrives during high school years. Some authorities stress the need for driver training for high school students. The evidence of practice does not point to a necessity for driver training. Liability and cost preclude driver training in public schools. Driver education, however, is imperative. There is a great chasm between the driving skill of youth and the use of the skill in conformity with safe practices in traffic.

Attitudes are usually blamed for the anti-social traffic practices of youth. The intangibles which create attitudes challenge the genius of education. Respect for law, responsibility for the welfare of others, courtesy, and all of the other civic attitudes deemed essential for traffic safety are products of educational procedure. Displays of the antitheses of these attitudes are not innate characteristics, but rather are they the product of more powerful influences than education has devised to displace them. Our schools face the greatest and most practical laboratory for education in attitudes through traffic safety. The answer is the product of systematic education in responsibilities for traffic safety.

Increased leisure time and the present variety of leisure activities have created a need for safety education which may be called recreational safety. The nature of leisure activities is based upon self-satisfaction of recreational urges. Freedom from supervision is a natural desire, but this search for recreational satisfactions invites many hazards. The type of activity may demand skill beyond the capacity of the individual. The urge of adventure may drive the individual to exceed his judgment. Strange environments may present features which will be acted upon with the tools of the familiar. Natural forces may not be weighed with relation to the individual's limitations. And, the writer recalls, a basic purpose of public education is *wise use of leisure time.*

Boating, camping, hiking, swimming, hunting, fishing, riding, skating, skiing, and biking represent some of the major leisure-time activities for individual participation. Each of these requires definite skills, controlling knowledge, effective habits, and governing attitudes. The writer has just received a pamphlet published by the Federal Government for the guidance of youth in the forest activities of the CCC camps. The publication is a striking illustration of recognized safety needs in the conservation of life and property in the forest areas, one in which specific knowledge, correct habits, and proper skills are defined for the various activities of the camp personnel.

IN the past, conduct controls in the prevention of accidents have been based largely on fear. The "bogey-man" control and the "or else" type of reasoning have been stressed for the avoidance of hazards. The inhibitive force of fear in the presence of emergency and the disruption of neuro-muscular controls in actions prompted by fear are too well known, however, for us to sanction the fear approach in the teaching of safety. Positive instruction in the various rudiments of safe conduct must displace gruesome evidence, morbid statistics, and fatalistic ideas.

Direct instruction emphasizing the correct and efficient controls in all activity is the method of safety education. Perhaps greater attention to the specific activities of all instruction relative to effective actions would attain most of the desired ends in safety.

Community coöperation is a further prerequisite for success in a school safety program. The existence of hazards in all phases of community activity provides a pattern for imitation which

depreciates the school instruction in safety. Actions of children and their attitudes of indifference toward civic welfare are reflected from the patterns of adult conduct. In spite of the school's establishment of safe pedestrian habits among children, adult violations soon modify these habits. The child cannot rationalize his adherence to a code of safe conduct while adults usurp contrary privileges as a selfish expediency. The success of a school program of safety will be measured by the degree of coöperative community enterprise. Every community agency should be enlisted in a common effort to conserve life and property. The amount of law enforcement necessary is only a reflection of the effectiveness of education toward prevention.

Premises have little value unless they are applied. Responsible leadership for safety instruction should be determined in each school with adequate time allotment in teaching load to permit the delegated authority to perform the obligations. Each school should analyze its specific safety needs through teacher, pupil, and community coöperation. These needs should be subjected to curricular analysis and integrated with the content and activities of the school. Applications involving direct pupil experience should be emphasized. The heterogeneous content on safety now available should be adapted to the purpose and procedures in the program. Practical content and method should evolve from a study of the needs rather than the use of content to determine purpose.

"Adventures in Safety": A Review

Here at last is a book that has been written to help youth get more fun from the adventure of living—*Adventures in Safety,* by Clifford Lee Brownell, Allen Gilbert Ireland and Charles Franklin Towne (Rand McNally and Company, 1939, 326 pages). This is a book which, as a guide in high school safety education, should help the student to know the science of safety, to recognize hazards and prevent accidents, and to understand penalties of carelessness so that they may be avoided. And by its approach and its arrangement, it should achieve these results.

Eight well-written, well-planned units comprise this book, each unit discussing the hazards and accidents within a large area of experience—Science Points the Way to Safety, the introduction; Safety at Home; Safety at School; Safety in Work; Safety in Play; Hazards of Street and Highway; Traveling Safely by Rail, Water, and Air; and the summary, Safety Through Coöperation. Each unit offers a stimulating preview designed to give a picture of the unit as a whole and to state the problems to be considered. Each unit closes with activities intended to summarize what has been learned and to assist the student in applying his knowledge to practical activities in everyday life. Lists of supplementary readings, safety plays and skits, and visual aids are suggested as additional means for enriching the understandings gained from study of each unit. An additional feature is the liberal supply of attractive halftones, drawings and charts which serve to make the context more meaningful.

This is one of the finest textbooks to appear in the field of safety, and it should be used extensively in the high schools of California where increased attention is being given to this vital phase of education. The book seems especially appropriate for core-course use, because it does present, in a pleasant, friendly, thought-stimulating way, materials *basic* to the very existence and well-being of every high school student, and materials which for the most part are not covered in the traditional program. The book, likewise, might provide the basis for a separate course in safety, or be used as an important part of existing courses in social studies, health, industrial arts, or homemaking.—Joseph Burton Vaschè, *Oakdale Union High School, Oakdale, California.*

A School Program of Safety Education

By EMMA M. BAUMGARDNER

THE problem of organizing and administering courses in safety education is one which faces every teacher, principal, and superintendent in the State of California. In Tracy Union High School we have been working for four years on such a program. Various factors and limitations connected with administration, materials, and teacher load have been considered when making our plans, plans which include not only giving our students knowledge, training, and habits in safe living, but also plans which reach out into the community and unify safety efforts and attitudes. As a result of these four years of experimentation, we believe that we are developing a program which encourages safe living practices.

The objectives which we hope to attain are

1. Practices conducive to health.
2. Mental attitudes conducive to safety.
3. Fundamentals of learning (knowledge and techniques related to safety).
4. Development of special interests through safety activities.
5. Vocational efficiency.
6. Safe recreation.
7. A sense of ethical and moral values.
8. Good citizenship.
9. Community and student coöperation.

Before we could create a program that would satisfy these objectives, we had to know the answer to two questions, namely:

1. What dangerous situations face our students in their daily environment?

2. What steps, if any, are taken to prepare them to meet those situations.

This article describes the extent of the program of safety education in a single school, emphasizing the fact that safety instruction must be integrated with the regular school subjects if it is to be efficient and effective. The program pictured herein is particularly interesting inasmuch as it is one conducted in a relatively small school—Tracy Union High School has an enrollment of 435 students and has 23 teachers on the faculty. Tracy is one of the State's Safety Demonstration Schools.

Miss Baumgardner is a teacher of speech and English at Tracy and, together with Principal W. W. Crow, has done experimental work in safety for the last four years. She is chairman of the Committee on Safety Education in Secondary Schools of San Joaquin County and in this capacity has organized safety councils throughout the county. Last summer she attended the Minnesota State Safety Conference in Duluth.

WE obtained the answer to the first question by making a thorough study of the accidents, of the illnesses, and of the absences from school during the preceding year. A questionnaire, combined with personal conferences and teacher reports, gave us a fairly accurate picture of the hazards our students were facing. They indicate that accidents in games, in the gymnasium, and in the home are as prevalent as accidents concerned with transportation.

The following accident report for 1938–1939 is indicative of some of the facts revealed:

	Total	"A"	"B"	"C"	"D"
Athletic Games	23	4	7	4	8
Gym	8	1	3	2	2
Home	6	6	0	0	0
Auto	4	1	0	1	2
Motorcycle	3	0	1	0	2
Shop	3	0	1	0	2
Cafeteria	2	0	2	0	0
Bicycles	6	4	2	0	0

"A"—Freshmen.
"B"—Sophomores.
"C"—Juniors.
"D"—Seniors.

After this study we were ready to answer our second question, namely: What are we doing about it?

We obtained the answer to this question by having each department list the dangerous situations which the teachers were already discussing in class as part of their regular subject matter. These departmental lists were then combined and made available for all teachers. This report had a threefold value:

1. The teacher become conscious that he was teaching safety.
2. He became conscious of other possibilities in his own field that he had not touched.
3. He become conscious of the safeguards taken by other teachers and so was able to coöperate to a greater degree in the safety program.

The data collected by the teachers in this inventory of their courses reveals that practically the entire field of safety is being covered. Some widely diversified illustrations follow:

Drama—safety back stage.

Home Economics—treatment in cases of poisoning; use of scissors in cutting out a dress.

The Shop—tests for the use of power machinery.

Music—prevention of mouth injuries while marching in band.

Science—use of fire extinguishers.

Mathematics—correct use of a compass.

In fact, so many techniques for safety were mentioned on these reports that listing all of them becomes impossible. We mention these few to show that safety education is so closely tied in with the matter of living that every teacher has ample opportunity to integrate it with his course. These illustrations also show that the teaching of safety is not a new thing; teachers have always taught safety. And just as the experienced superintendent refused to become excited a few years ago when the wave of "integration hysteria" struck, so the educator today should refrain from hysteria in the teaching of safety, for safety instruction is a functional type of thing; it is not dramatic. Safety education should contain little of the spectacular since it involves, not accidents, but skills, techniques, and attitudes for working and playing. The directions for making a cake are not spectacular, nor are the directions, for the proper use of the electric beater, the cord, or the outlet. Systematic training in the use of electrical equipment forestalls the necessity for teaching what to do in case of shock.

OUR problem, then, in creating a well-balanced program of safe living practices, was to create courses in which new skills and abilities would supplement procedures already effective. But, no one takes all the courses offered, so many students were not getting the necessary groundwork. It therefore seemed advisable to select materials that are fundamental, arranging them in units, one for each of the four years of high school, and make them accessible to all students. The problem of administering the teaching program has been solved in Tracy High School by placing a unit on safety in each activity (homeroom) group. Thus each child studies four different units while in high school.

The freshman unit deals with safe practices in the flying of kites, in walking, and in riding bicycles. Reasons for protective measures listed in the Vehicle Code are discussed, attention is called to the problems of the bicycle rider, and possible solutions are suggested.

Sophomores study safety in the home and on the farm, with some emphasis on first aid. Safety on the playground is handled entirely by the physical education teachers, since they contact every child in school. Highway hazards are briefly discussed.

During the junior year many students reach the age when they are eligible to become licensed drivers. Since there seems to be no class where all juniors can be reached the preparation for the Drivers' Examination is included in the homeroom unit for this year. This course particularly details the reasons for the present laws contained in the Motor Vehicle Code, with stress on individual responsibility and on laws that protect car owners and drivers. Every effort is made to teach this unit constructively, with plenty of discussion concerning necessary improvements. Great emphasis is placed upon safe-driving practices and upon knowing the Code.

Passing the "Safety Hurdle" is a graduation requirement. The hurdle, a difficult test covering all phases of pedestrian and driver responsibility, is formulated by the school's chairman of safety with the coöperation of a traffic officer. Whenever the equipment is available, physical tests for reaction and braking time and telebinocular and depth perception tests are given. This unit needs no motivating, for students are eager to receive this traffic training and parents wait in line to give their written consent. Passing the hurdle qualifies a student to take the Drivers' License Examination, which is administered by State examiners who come to us each year from Sacramento.

During the senior year we find that students' attitudes for the most part are already formed, but that there is much interest in the scientific aspect of safety, first aid, and so forth.

This arrangement of courses is by no means an arbitrary one. It is one that fits our particular situation at the present, and it will be altered when circumstances arise that necessitate a change.

IN securing a well-balanced program, we have considered not only objectives, needs, integration, and course content, but also student participation in safety activities. The High School Safety Council is our means of giving many students an opportunity to participate effectively in the practical features of the safety program.

This group, which is composed of eight students, two from each class, works with a faculty adviser. Early in the first semester it meets with all car drivers. Available parking areas are charted, danger spots located, speed on the grounds determined, traffic signs chosen, and the whole practical aspect of safety on the school grounds is assigned to committees which formulate definite plans for safety and efficiency. Plans are discussed with the custodians of the grounds and approved by the principal. When the various plans have been submitted to the entire group of car drivers for a vote, the approved provisions become effective.

Under the lead of the Safety Council, a bicycle committee at the present time is bringing order out of chaos in the bicycle parking situation. As a result of the work of this committee the racks have been moved to a more convenient location, designs of new racks that will hold a new type of bicycle have been drawn, and arrangements for an exit, free from cars and pedestrians, have been made. At present the committee is at work with the City Council on a plan that will enable riders to have a license that carries insurance with it.

The Safety Council arranges for fire drills, which are motivated this year by the desire to eliminate fire hazards that might arise at such special meetings as

assemblies, plays, rallies, dances, and class meetings. Every student is expected to know where all the fire extinguishers are and how to use them. Diagrams of the buildings, prepared by the mechanical drawing class, assist the student in learning the location of all fire equipment.

The High School Safety Council sponsors one assembly each semester. It also sponsors radio play production and contests. The members check parking, careless driving, absence of registration slips, and so forth. Violations are reported by means of a 4 x 6 card. Violators are called in for a conference with the safety chairman, who explains the necessity for regulation and who is ready to assist the student secure registration slip, braking test, or to take action to correct any other violation.

Members of the Council also attend to placing posters on the bulletin boards weekly. At football and baseball games, and at other meetings, they see that a reminder, "Drive Carefully After the Game," is announced over the loudspeaker.

THE well-balanced program must have the coöperation of the home and the community to make any safety work effective, and fortunately we have received coöperation from a variety of sources.

The Farm and Home Survey of the Red Cross gives us a fairly definite picture of the conditions in the home, and, so far as possible, we take advantage of it by making materials on safety in the home available. The Parent-Teacher Association has used student speakers and demonstrations on its programs and has brought worthwhile programs to us. The local newspaper has published material that we wished to bring before the public; theater owners have been interested in showing "shorts" that fit into our programs; and service clubs have sponsored moving pictures dealing with traffic problems. Garage owners have given demonstrations of the safety features of new cars. The local police force has explained finger printing, laws protecting minors, and allied subjects. The County and State Motor Vehicle Departments have furnished us with examiners, testing equipment, and materials to aid us in our program.

In fact, the facilities of the entire community are ours to command, for school authorities do not have to sell this program to the community. The community is already behind the effort, and the program is self-motivating.

OUR plan has not worked perfectly. We still have traffic accidents, injuries in games, burns in the kitchen, injuries in the shop. But our monthly report shows us that absences from such accidents are decreasing, and we feel that there is a definite acceptance among our students of the fact that "It is smart to be safe."

These, then, are the steps that we have taken in reaching our main objective—a well-balanced program in safe living practices, a program based on the needs of the students in this particular environment. By coördination of effort we have integrated procedures already effective with new procedures and units which insure new skills and abilities. Through student, teacher, community, and state participation we have pointed the way toward increased ability to direct the course of subsequent experience.

Millions Transported to School

Four million children will be transported to school each day during the 1939-40 school term.

A County Organization for Safety Education

By C. C. TRILLINGHAM

ONE school superintendent in Los Angeles County recently had twenty-eight letters on his desk in which the writers made definite suggestions, proposals, or requests regarding safety education in the schools. Many of these associations and organizations were sponsoring essay, poster, or oratorical contests relating to safety and were asking the schools to coöperate in their undertakings. The majority of them were concerned primarily with traffic safety. Obviously, it was impossible for this school superintendent to coöperate with all these agencies.

This situation indicates (1) that many nonschool groups are vitally interested in the safety problem and desire to make educational contributions to the safeguarding of life, health, and property, and (2) that the many safety-education efforts sponsored must be coördinated through one office or individual in order that they may make the best possible contributions and avoid becoming a nuisance to the schools. Fortunately, the California State Department of Education and the University of California have united their forces in an attempt to coördinate the work of both school and nonschool groups interested in safety.

In Los Angeles County we have found it helpful to organize a county-wide program in safety instruction. The main purpose of this article is to describe some of the developments in safety education in the County secondary schools and to tell of the part played by the County Superintendent's Office in promoting the program.

In earlier articles of this symposium, we have seen how the state's program of safety education and the program of a single school have been organized. In the present article we find a description of how the schools of a county have organized to provide a better program of safety instruction.

Dr. Trillingham, who makes this contribution, is assistant superintendent of Los Angeles County Schools. He works with the secondary schools, giving particular attention to problems of curriculum improvement. As a member of the "Journal's" editorial staff, he has long advocated the need for a symposium on safety education, and so it is particularly fitting that a description of the Los Angeles County program which he has sponsored be included at the present time.

IN the school year of 1935-36, the Los Angeles County High School Principals' Association asked County Superintendent A. R. Clifton to appoint a committee to consider how safety instruction in the high schools might be improved and extended. A committee of three administrators was appointed, consisting of John E. Alman of South Pasadena, Johnston E. Walker of Pomona, and Frank C. Otto of Downey, chairman. This committee made two distinct contributions to safety education in Los Angeles County. First, they recommended that each high school principal be urged to appoint some interested and qualified member of his staff as safety chairman or coördinator for his school. When every principal in the

county schools coöperated in this suggestion, the committee proposed that these school safety chairmen should be brought together occasionally by the county office for purposes of reporting their own work and learning what the others were doing.

It was agreed that the main function of each school safety chairman should be to plan better safety teaching with the faculty members of his school, to keep the teachers informed as to available materials and appropriate methods, and to report the safety activities of his school to the county office.

The second contribution of the committee was the preparation of a monograph entitled *Safety Education* which contained background information and suggested problems, activities, and reading lists. This monograph was published by the Secondary Division of the County Office in November, 1936. The following spring, the California High School Principals' Association distributed copies to all principals who attended the annual conference of the Association. Also prepared and distributed was an information bulletin which contained brief descriptions of the best things the schools were doing or planning to do along safety education lines.

SOME of the later safety developments merit mention. Each fall, institute sessions have been offered dealing with various phases of the safety program. Newman C. Borden, safety chairman at Beverly Hills High School, has prepared a monograph entitled *Teaching Traffic Safety,* which contains practical suggestions for teaching highway safety in each curriculum field. Beecher Fawcett, safety chairman for the Inglewood Union High School District, has developed a monograph entitled *Protecting Life, Health, and Property,* which contains practical suggestions for teaching safety along lines other than traffic. A local committee of teachers assisted in the preparation of this bulletin by reporting actual teaching practices. These two monographs were published by the Secondary Division and distributed widely in the secondary schools of Los Angeles County. Requests from outside the county have been filled at a charge of 10 cents each to defray actual costs of mailing and material.

Each spring since the appointment of safety chairmen of the high schools, the county office has sponsored a dinner conference for the group. At these conferences, brief reports of accomplishment are given and problems that are encountered in local schools are discussed. Occasionally, guest speakers are invited to contribute to these meetings. As might be expected, some schools have developed outstanding programs in safety instruction, while others have accomplished comparatively little. Some schools report satisfactory programs of safety instruction which permeate the entire curriculum, while others concentrate their efforts in one or two curriculum fields. A few schools sponsor special safety weeks. Several have cooperated actively with their community agencies, such as the civic clubs and police. Too many schools have given most of their safety emphasis to problems of traffic safety and have ignored too much the other important aspects of safety. All in all, meetings have been held, ideas have been exchanged, excellent materials have been prepared and made available, schools have improved their safety instruction, and teachers, pupils, and administrators have become more safety-minded. The work of the original committee of three principals has undoubtedly resulted in worthy progress.

Present efforts are being made by the County Office to discover why cer-

tain schools have been able to develop better balanced safety programs than others. Toward this end, Newman Borden, Beecher Fawcett, and Herbert Lund, the safety chairmen of Beverly Hills, Inglewood, and Compton, respectively, were appointed as a county committee to meet with Dr. Frank K. Foster and representatives of the county office in considering this problem. The Beverly Hills High School, the Inglewood Union High School District, and the junior high schools of the Compton Union Secondary District have been designated as three of the twenty-four school systems in the state for the purpose of carrying on experimental practices in safety instruction. These schools were so selected by Dr. Foster because of outstanding work done in the past. The administrators of these schools are giving their safety chairmen additional school time for planning and coördinating the safety work. Teacher committees have been appointed and are coöperating with the chairmen. Local programs are being extended and new practices are being tried.

When the annual conference for the safety chairmen of Los Angeles County high schools is held this spring, reports will be given of the accomplishments in the three experimental schools along safety lines. It is hoped that the three men who are directing the experimental work in these schools may be able to shed some light on what features are necessary for the success of a school-wide safety instruction program. Furthermore, it is planned that this committee, in coöperation with Dr. Foster and the County Office, may outline a statement for a good safety program in the typical high school showing definite responsibilities, policies, and procedures which seem necessary to produce the best results.

The committee also contemplates the preparation of suggested instructional activities for the teachers of each subject field and specific safety suggestions for school custodians.

IN the meantime, observation and experience make it safe to offer the following guiding principles which seem essential to the development of a sound program of safety instruction in any high school:

1. If it is to succeed, any so-called county (or state) program must have its center of gravity in the individual schools it attempts to serve.

2. The key person in the success of a school's safety program is the principal. The results obtained are not likely to exceed the principal's interest and enthusiasm for the program. The principal should give his constant and active support to the safety program of the school.

3. Unless the principal actively directs his own safety program, such responsibility should be delegated to an interested and qualified staff member.

4. The person who is delegated the responsibility for organizing, directing, and coordinating the safety program should be granted a reasonable amount of school time for planning and carrying on this work. The safety chairman should be held responsible for the establishment and the successful growth of the school's safety program.

5. When a staff member has been delegated the leadership and direction of the safety program of the school, that fact should be officially announced by the principal and the coöperation of all teachers should be enlisted. A representative committee of teachers should work with the safety chairman in developing the local school program. The safety chairman should be given authority commensurate with his responsibility.

6. Suitable recognition should be given to the work of the safety chairman and those who assist him. Regular and appropriate publicity should be given the school safety program and its accomplishments.

A Method for Creating Safer Drivers

By EDWIN D. FLETCHER

MOTOR vehicle accidents have taken a terrific toll in California during the past ten years. In this period there has been killed or injured the almost unbelievable total of over ninety thousand children of school age and four times as many adults.

This serious problem has been attacked from many approaches, but none is more significant to the educators of California than that embarked upon by the State Department of Motor Vehicles in 1936.

Students of the traffic accident problem have gradually formed the theory that a major cause of accidents is the driver who is prone to accidents. Certain drivers are "born to crash," as one expert has stated, and the necessary remedy is to prevent these people from driving. They must be searched out through the use of accident files, which will reveal the "repeaters." These accident repeaters are the drivers destined to have accidents, so it is essential that they be barred from our streets and highways if the traffic accident problem is to be solved.

This theory is an excellent one and there is a mass of general evidence to support it. Some time ago the California State Department of Motor Vehicles became interested in it, and through its Division of Drivers' Licenses took the necessary steps to make an intensive study of the facts.

It was a comparatively easy matter to obtain the names of accident repeaters and habitual violators. Copies of all reportable accidents are sent to Sacramento, and so are copies of all traffic violation convictions. These reports are filed alphabetically under the names of the individuals concerned, and the "repeaters" are transferred to special files for quick reference and closer attention. These state-wide records have furnished an excellent source from which to draw a group of people who apparently are destined to create our traffic accident problem.

In order to study these repeaters properly, the Division of Drivers'

In this very interesting article, Mr. Fletcher describes a technique of driver education which has had remarkable results in the re-education of accident repeaters and which he thinks is adaptable to the uses of the school in anticipating the conditions which make reëducation necessary.

Mr. Fletcher is a driver's license examiner in the Division of Drivers' Licenses of the California State Department of Motor Vehicles. As an "examiner in charge of research," he has traveled all over California during the past three years, "testing and interviewing every imaginable type of driver—special cases, accident repeaters, habitual violators, famous racing drivers, and ordinary drivers ranging all the way from illiterate laborers to famous executives and movie stars." He has been a lecturer in police institutes at the University of California, in Berkeley and in Los Angeles, and has conducted seminars on driving problems. He wants it understood that "Paul Mason, chief of the Division of Drivers' Licenses, is the man responsible for making possible much of the good work in the field of drivers' tests and licensing."

Licenses assembled a large battery of special psychological and physiological tests for measuring driving skills and abilities. Specially trained men were selected from the ranks of the State driver's license examiners and were assigned to the task of conducting this "Drivers' Clinic." A state-wide survey followed, ultimately resulting in the careful testing of over thirty thousand drivers.

A thorough study of the first group of accident repeaters examined revealed many interesting facts. These drivers were not a special type. They came from many walks of life. They were intelligent, responsible individuals, showing little or no anti-social tendencies. Most of them had been graduated from high school; many had completed college. They had been involved in accidents of every conceivable type.

The most surprising finding was that a great many of these drivers had defects in their driving skills and abilities, and these defects showed marked relation to their accidents and traffic difficulties. For example, one group of drivers was examined to determine why they attempted improper passing tactics such as "cutting in," passing too closely, and not allowing sufficient clearance for oncoming cars. Over 80 per cent of these drivers were found to have faulty timing, speed estimation, or distance judgment. A group of drivers, each involved in a fatal accident, was checked, and one in every twelve of them was found to have little or no vision in one eye. Every accident had originated on the defective vision side. The existence of deficiencies was almost unbelievable to most of these drivers and it was usually necessary to demonstrate the presence of the defect and then explain how it was related to the accident situation. These drivers, however, showed genuine interest in the information given to them.

This preliminary series of examinations certainly verified the "born to crash" theory. Additional evidence was revealed when a large group of several hundred expert drivers was examined. These comparatively accident-free drivers consisted of truck drivers, taxi drivers, bus drivers, and California Highway Patrolmen. It was found that most of them were exceptional or above average in their driving skills and abilities, and major defects were practically nonexistent among them. Apparently these were the drivers "born to drive safely."

The evidence was apparently conclusive that our accident problem could be materially reduced by refusing driving privileges to accident-prone drivers, and especially to those who have been accident repeaters.

A FURTHER study of this problem was made. This time a group of ordinary "safe" drivers was invited in for examination. These people did not drive ambulances, trucks, buses, or motorcycles, but they made their living by other means. They merely used their automobiles for transportation and pleasure, and driving was an incidental task for them. They were not expert drivers; yet neither were they accident drivers. In their many years of driving they had never been in an accident and they had never received a conviction for a traffic violation. By performance standards they were "safe" drivers.

Careful examination of these "safe" drivers revealed that most of them had deficiencies in their natural driving skills and abilities, and these defects often were more serious than those of the worst accident repeaters. Although these people were not of the expert, top ability group "born to drive safely," they actually had driven safely for periods as high as thirty years. They appeared to belong to the group that was

"born to crash," but they simply had not crashed. What was the answer? How could apparently accident-prone drivers remain accident free?

Further study revealed the answer to this puzzling problem. It was not differences in age, driving experience, yearly mileage, intelligence, or school training. The outstanding fact was that these drivers were thoroughly informed on rules of the road and safe driving practices. Furthermore, they knew what their shortcomings were and made allowances for them in their driving. Sometimes they had unrealized deficiencies, but they knowingly or unknowingly compensated for them because they felt safer driving that way.

A "safe" driver, with slow reaction time, usually knew what the reaction test would reveal before he took the test. He told the examiner what would be found, and he also told him how he drove to offset it. The actual road test revealed that he drove more slowly than the average driver, that he slowed up for blind intersections and dangerous areas, and that he was mentally prepared for possible emergency situations before he met them.

On the other hand, the "accident" driver usually protested the need for measuring him on the brake reaction test. The examination often showed that his reaction time was average or better. It also showed that he overestimated his actual reaction time and nearly always drove in a manner that did not allow the proper margin of safety in event of an emergency stop.

The "safe" drivers admitted they were glare sensitive before they were examined on the glare vision test, and they told the examiners how they offset their weakness by careful night driving, and in some cases by doing no night driving. Glare sensitive "accident" drivers were sure their glare vision was satisfactory and usually complained about the large number of illegally bright headlights met on the highway.

OUT of these surprising discoveries emerged a new supposition, one of profound interest to educators. Since most driving deficiencies and limitations can be compensated for, all accident-prone drivers are not born inevitably to crash. They simply have to learn of their shortcomings, then do something about it. Theoretically, even the most confirmed accident repeater might possibly become a safe driver if he learned of his limitations and made an honest effort to drive within those limitations.

The possibilities of reclaiming the drivers who are "born to crash" has been carefully studied by the Division of Drivers' Licenses in a series of controlled experiments; and the same results have been found each time. The results of one study are shown here.[1]

A random group of 288 accident repeaters was drawn from the files and divided into two equal groups. The group more actively inclined to accidents was called in for reëxamination, and the other group remained untested. All of these people were driving in the same area, under similar conditions. Everyone of them had been involved in three or more accidents in which someone had been killed or injured. The only difference between the two groups was that the tested group had the benefit of a special reëxamination in the Drivers' Clinic. Individuals in this group were given an extensive analysis of their driving skills and limitations and were shown how they could improve their driving. Any improvement of the tested drivers over the untested drivers could be attributed largely to the reëducational effect of the Clinic.

---

1 Further details concerning these experiments may be found in the August and September issues of the *California Highway Patrolman* magazine.

For the two years before the tests, the subsequently reëxamined drivers had approximately 28 per cent *more* accidents than the untested drivers. For the two years following the work in the Clinic, the reëxamined drivers had approximately 85 per cent *less* accidents than the untested drivers.

Thus, confirmed accident repeaters exposed to the reëducational effects of the Drivers' Clinic actually reduced their accidents 94 per cent! The reduction was effective immediately following the tests and was maintained through the two-year period just completed.

THE technique of the Drivers' Clinic is simple and easily applied. The individual who is examined is tested extensively to determine his knowledge of the rules of the road. A series of special psychological and physiological tests, particularly for vision, is administered to reveal weaknesses and limitations. An actual road test is given to make known his driving habits and whether he is adequately compensating for his weaknesses and driving within his limitations. Finally, an interview sums up the findings and brings out suggestions for improving his driving.

The Drivers' Clinic furnishes information on two major fundamentals of safe driving, and in doing so it improves or creates a third one. Firstly, it improves the individual's knowledge of the rules of the road and shows him why these rules have been adopted into law. Secondly, it adds to his knowledge of himself, showing him his deficiencies and limitations and how they may be compensated for. Thirdly, through this practical understanding of the task of driving safely, it improves the attitude of the individual examined and interviewed.

The success of this reëducational approach has been demonstrated repeatedly by the Division of Drivers' Licenses, and material results have been obtained in improving groups of both good drivers and poor drivers. Since the application of these methods is so genuinely worth-while it follows that ultimately they will be used far more extensively in the future. If accident prone drivers are reclaimable, before or after having accidents, it should be the responsibility of someone to reclaim them and to start the reclaiming before traffic difficulties commence. Most people embark on their driving careers during their high school years, thus making the high school the most logical place to start the process of building a thorough background for safe driving in the future drivers of California.

The reëducation of thousands of drivers in California is seriously needed; however, there is a task far more important than the reëducation of drivers. It is the task of properly educating the drivers in the first place so that the need for eventual reëducation is minimized. The preëducation of drivers should be done in the schools, by teachers specially prepared for this task. It is primarily their work, and no one is in a better position to carry it out than are they.

Schools in this state and elsewhere are slowly gaining ground in organizing traffic safety materials. Courses designed to furnish an adequate traffic safety background for high school students will soon be the general requirement. The teaching of this safe driving and safe walking background should not include the actual driving of an automobile, for that should not be a school function at the present time. Schools will find that the formation of a purely educational background is a tremendous task in itself, a task so large that it may take several years of intensive effort before the results of such a program first become noticeable.

Highway Patrol Coöperates With Schools

By E. RAYMOND CATO

In the winter of 1930-31 some thirty-odd school children were killed in highway accidents. Now, largely through activity of the California Highway Patrol, such tragedies have been practically eliminated. What the Patrol is doing to help with the traffic problem is described in the present article. Chief Cato has been in charge of the Patrol since his appointment by the governor in 1931. Under his direction, members of the Patrol have been detailed in each county to the service of regulating and protecting school children, to safeguarding transportation to and from school, and to instructing in highway safety these boys and girls who are to become our future citizens.

Before accepting his present position, Chief Cato was a member of the Los Angeles Police Department, serving in a variety of important capacities during the twenty years he was with the Department. His experiences as acting chief of detectives and as captain of detectives read like an adventure story.

THE value of education as applied to traffic safety has always been one of the principal interests of the California Highway Patrol. We have a definite belief that the greater the amount of information which may be given, the greater will be the degree of safety in the operation of motor vehicles by a large per cent of those whom we are able to reach.

It has been the good fortune of the Patrol to participate in the safety programs of many of our schools and to work with the educators who are given the responsibility of encouraging this program in California. In every possible way we have sought to support and coöperate with the school authorities in their safety programs.

We have found in many schools that a great deal of preliminary "selling" work has been accomplished by the school administrators in bringing about a better appreciation of traffic safety in the minds of the class instructors. With this receptive attitude, the California Highway Patrol has been able to secure splendid coöperation in a number of different ways.

The Patrol has been fortunate in being able to play an important part in the matter of school bus supervision, thus being instrumental in bringing the safety standard of California school buses to a very high point.

We supervise some twenty-six hundred school buses throughout the State to the extent of passing upon the equipment and construction of the vehicles insofar as their safety requirements are concerned, requirements based on the restrictions indicated by the State Department of Education. The California Highway Patrol is charged with the responsibility of enforcing these regulations and restrictions.

Each day each bus makes from one to half-a-dozen trips, and it has been estimated that considerably over three hundred thousand pupils are transported to and from their homes in the districts where public school buses operate. By a better understanding and through closer coöperation with the school trustees and teachers, who have assisted us in carrying out the strict

regulations of the State Department of Education, we have been able to strengthen the safety factors of our school buses. As a result, there has not been one child killed while riding in a public school bus since 1932, the year when we took over this work.

We likewise have been happy to participate in the junior traffic patrol work. Traffic officers throughout the State have coöperated with school officials, who are sympathetic to traffic education and who have shown a willingness to do everything possible to assist statewide effort to reduce traffic accidents.

Junior patrols are confined practically to the larger boys in the seventh and eighth grades, and each day thousands of these youngsters throughout the state perform a most important function without compensation or any reward other than that of knowing that they may have been instrumental in preventing injury or death to some of their schoolmates.

Additionally, the Patrol has had the opportunity at many times to send qualified officers to various gatherings to bring to the attention of students the importance of safe driving upon the highways. The officers also have met with the members of parent-teacher associations and other school groups throughout the state where, undoubtedly, a great deal of excellent work has been accomplished.

We have been fortunate in having the coöperation of the athletic instructors of many schools, and our approach to the safety problem has been along the lines of sportsmanship. School children soon become acquainted with the principles of fair play in athletic sports, and the Patrol has been able to impart messages on personal safety on the highways through the appeal to the sportsmanship of the children.

The Patrol has found a large majority of teachers and school administrators to have a definite and lively interest in the matter of traffic safety education, and wherever it has been possible we have extended our efforts to encourage them. We are constantly training as many of our officers as is possible so that they may be available for short periods to devote some time in coöperating with traffic programs in schools throughout the state.

WITH the program as now outlined in the schools, we feel that the Patrol can find a splendid channel for coöperating and assisting continually. Without the understanding of this problem of safety by the school administrators and teaching staff, it would be difficult for us to attain our objective of safer motoring and greater safety on the highways for pedestrians.

Especially are we looking forward to the results which should be reflected in the future in safer driving on our highways on the part of many who are now children as a result of the courses in driving now available in many schools. Proper training and instruction in the operation of a motor vehicle, its mechanical functions, and human limitations, undoubtedly will prove of greatest value in adding to safety on the highways. The children who find such courses available now have a distinct advantage over their elders, most of whom learned how to operate a motor vehicle by "picking up" the idea.

The teachers of the state are to be commended for their loyalty and energy in understanding, analyzing, and stressing traffic safety wherever it is possible for them to do so. As an enforcement agency, the California Highway Patrol has the most profound respect for the value of education, which necessarily must play a very important part in our future if we are to combat a situation on the highways which consistently threatens motorists and pedestrians.

A Workable Safety Program For School Shops

By CLIFFORD C. SCOTT

Any school's safety program must be more than an instructional program if it is to be effective, for, as Dr. Foster points out in the first article of this symposium, safety education must result in a way of thinking rather than in a knowledge of safety information. Thus the article by Mr. Scott is particularly significant for it describes a method whereby students themselves actually participate in safety experiences, reducing the number of accidents in a school shop department and at the same time gaining an understanding of the meaning of "safety."

Mr. Scott has been an instructor in woodshop at the Kern County Union High School, Bakersfield, for the past sixteen years. He organized the Shop Safety Council described in this article and for five years has been its adviser. He is the present president of the California Industrial Education Association, Central Section.

THE safety program as conducted in the Shop Department of the Kern County Union High School of Bakersfield has been operating for five years and has proved so effective that it is now an integral part of the regular curriculum. It is carried on by students and aims to function as an additional aid to the regular program of safety which every instructor of shop must necessarily practice. Instead of being teacher-imposed, this program aims directly at student coöperation.

At the beginning of every school year each shop instructor appoints a student to represent him on the Safety Council. Since our department has fourteen instructors, the Council is composed of fourteen members; one of the instructors is appointed as adviser to the group. The Council meets together every day during a regular school period, and each representative is allowed a quarter credit to be applied as an elective unit. If certain boys find it necessary to change their course at midyear, new representatives are appointed as required.

The group is organized as a club, selects its own officers, adopts an emblem or insignia for school use, and is granted a charter by the student body executive committee. The $25 or so required each year to finance the project is cared for by the Shop Department as a whole or from administrative funds. Emblems, a club picture in the yearbook, achievement banners, and engraved plaques account for the various uses of this fund.

Probably the most effective work of the Safety Council is its daily inspection of the shops. It is this constant vigilance on the part of these boys which prevents evident hazards from growing into certain accidents. Each boy must make a tour of the shops at least once in every twenty days. Since he represents one of the shops, it is understood that he is to be excused from his shop period to make this inspection. It is also understood that he is not required to make an inspection of the shop which he personally represents.

Before leaving the inspected shop the commissioner must present his findings to the instructor and have him sign his

initials to the inspection. In this way the instructor is warned of any possible hazard which exists and which might easily escape his attention. The day following his inspection the student reports his findings to the Safety Council and each member posts the result on his bulletin board, using a mimeographed form already prepared for that purpose. If a shop has a good record, an o. k. is posted on a white form. If a hazard has been discovered a red form is used to note its occurrence.

WHEN the Council was originally organized the first task before it was to shape a guide book by which the various shops could be judged and later rated. Naturally, this took considerable time. In the beginning the adviser arranged for each instructor to talk with the Council, outlining what he considered to be the outstanding hazards in his shop. The safety instructions pertaining to each type of machine were explained and the Council secretary made adequate notes for future reference. Following this the Council made a tour of all the shops, noting the general hazards which seemed to be applicable in every shop. The material thus gathered was then organized into a form which could be used as a basis for all inspections. For five years we have used the form first assembled. Very few changes have since been necessary, proving the effectiveness of the work of these first Council members.

Reference to a few of these general hazards might be suggestive for any school desiring to work out a similar program. Oily rags not placed in a tightly covered metal container are always dangerous, as is oil allowed to puddle on the floor. Broken panes of glass in any movable sash and sharp objects left protruding from vises very easily cause accidents. Tools should never be allowed to become defective; thus wedges must always be kept tight in hammers and burrs must never be allowed to gather on chisels, flatters, et cetera. Long stock carried over the shoulder through crowded classes and stock allowed to lean against smooth surfaces have caused many injuries. Round stock allowed to lie around in the aisles makes dangerous roller skates. An item which we call "horseplay" figures very largely in our program as being exceedingly dangerous when practiced in the vicinity of running machines. These and many other similar dangers are to be found in all school shops.

The fact that all hazards do not possess the same degree of danger was early recognized. Thus standing directly in front of a grinder while grinding is penalized by one demerit; grinding without goggles, two demerits; if the rest is more than one-eighth of an inch away from the wheel three demerits are given. In this manner demerit values must be ascribed to every hazard. Demerits are also given for injuries where carelessness or direct violation of safety rules is responsible. Three demerits is the penalty for minor injuries where only a bandage is necessary, and five demerits are given where the student requires the attention of a physician.

With due consideration to both general and specific risks, a book in mimeographed form was finally developed in which a page was given for each shop. This then became the guide for all future inspections. As new problems arise they are discussed by the club. Throughout the past years a few outmoded hazards have been removed and some new ones added as deemed necessary. By means of these inspections and discussions new vigor is constantly provided which prevents the activity from becoming stale and lifeless.

It can be readily understood that all shops are not on an equal basis as far as the number of prevalent hazards

is concerned. The crowded conditions in the various shops also differ. To offset these differences, two variables were worked out to enable the Council to score the shops in a comprehensive manner.

The first variable considers the fact that different shops have a different number of dangers. Besides general and specific hazards, each individual machine was felt to be potentially dangerous. The shop with the largest number of risks was given a variable of one. The other shops were then brought up on a par with this figure. To illustrate, our machine shop was calculated to have eighty-five dangers. The cold metal shop had only forty-six. By dividing eighty-five by forty-six, the variable for cold metal becomes 1.85.

The second variable, usually called an index, provides for the variations due to crowded conditions in the shops. The total floor space of each shop was measured and computed. From this figure allowance was made for every permanent object such as machines, tool rooms, et cetera. The total enrollment of the particular shop was figured on the actual number of days the students spent on the floor in every school month of twenty days. Thus if auto shop students had classroom one day each week, they would spend only sixteen days each month on the shop floor. Multiplying the enrollment by the sixteen days and then dividing the whole into the actual floor space gave us the second variable.

These variables seem quite complex, and yet it is impossible to compute balanced scores and award banners without them. The first variable is fairly constant. The second variable changes with the enrollment each semester.

The formula for figuring awards is as follows:

1. Total demerits (including injuries) divided by the number of inspections.
2. Quotient of No. 1 multiplied by the first variable.
3. The product of No. 2 multiplied by the index.
4. The product of No. 3 subtracted from 100 to give the final score.

First, second, and third place banners are awarded each month on the basis of the scores thus computed. In addition to the banners a plaque was provided by the administration, and any shop which wins the first place banner three times in any one year may have its name engraved upon the plaque. The plaque then becomes the property of that shop until it is taken away by some other shop.

AS to the effectiveness of this plan in cutting down accidents, it is difficult to present actual figures. We know for a fact that injuries this year are almost 75 per cent less than in 1935. In the year 1937 they were slightly increased over 1936. Taken over the entire period, however, there has been a steady drop in accidents, and for the fall of 1938 on up through the spring of 1939 we have had but four minor injuries and one injury requiring a doctor's treatment. When you consider that the total shop enrollment is now over fifteen hundred, the percentage of actual injuries is extremely low.

Our school changed from the double period to the single hour period this year, and the advisory period during which the Council had done its work under the old schedule was dropped. The administration felt that the shop safety program was so worth-while, however, that they placed it on the schedule as a part of the regular curriculum with credit allowed.

But the finest part of the whole movement is the subconscious spirit which seems to possess the entire shop student body. We believe that through persistent effort we are finally realizing the aim of our slogan: "Let us learn to work safely."

Teacher Responsibility and The Fire Problem

By CHARLES W. BAHME

Certain responsibilities with regard to the fire problem are placed on the schools by law. In this article these are reviewed, insofar as they apply to Los Angeles schools, at least. The material contained in this article should furnish Los Angeles teachers a source of information in regard to the specific duties which are theirs, and it will be of interest to teachers generally because it is likely to stimulate them to investigate the responsibilities which their own state and community place upon them.

Mr. Bahme, who writes the article, is an inspector on the School Detail, Bureau of Fire Prevention, Los Angeles Fire Department. As such, he has been working in Los Angeles schools during the last two years, making inspections and giving lectures and demonstrations. At the present time, while serving in the Los Angeles Fire Department, he is completing his law studies.

A STATEMENT that the fire problem is primarily a question of education in the field of fire prevention is not only a repetition of a truism applicable to all other phases of safety, but, like all general postulates of this nature, it is one that has little meaning when it fails to fix a definite responsibility upon definite persons who are to provide such education. In California, fortunately, there is no need to resort to any broad assumption to assert that the ultimate responsibility for fire prevention education rests upon the teacher, for society has seen fit to enact such a requirement into our State law.

Article V of the School Code[1] provides that it shall be the duty of each teacher in any public school in the State of California to devote a reasonable time in each month during which school is in session to instruct the pupils in fire prevention, including the ways and means of preventing loss of life and property through preventable fires.

This law of ours, which was drafted some twenty years ago,[2] attempts to set forth the objects of instruction in the following manner: "(1) To create an understanding of the cause and origin of fires. (2) To emphasize the dangers of carelessness and neglect in homes and public buildings, and the necessity of care in the use of fires. (3) To promote an interest in the preventing of fires and the protection of life and property." These were to be the objectives of a course of study in fire prevention which the law directed to be drawn up.

To have a law, without more, is only the incipient stage in accomplishing the intent of the law. To what avail is the requirement that a teacher devote time to a study of fire prevention, unless the teacher has an insight into the vast scope and nature of the fire problem in his community?

As yet the State Board of Education reports that no action has been taken to fulfill these statutory requirements, but the fact remains that teachers of public schools, whether primary, secondary, or higher, are still required to teach fire prevention.

1 Article V, Section 3.725.

2 The law, which first went into the General Laws of California as Chapter 93, page 89, was approved May 12, 1921, and went into effect July 29, 1921.

IT is self-evident that a condition precedent to any fire prevention instruction is a knowledge of the most frequent causes of fire in the student's locality. Even within a single city, to say nothing of a state, the fire problem varies from one locality to another, depending in part upon the climate, topography, economic levels, ethnical differences, and occupations of the inhabitants. Let us take, for an example, the broad occupational divisions in a city like Los Angeles: The Venice area has for a major problem the oil well industry with its attendant danger from the handling and storing of inflammable liquids, while the Hollywood area, with its film industry, has the hazard which follows from the abundant use of cellulose nitrate products; in the San Pedro Harbor area arise the fire problems that accompany the shipping of lumber and oil; and the 108 square miles of mountain area require attention to the more specialized danger from forest fires.

Thus it can be seen that a knowledge of the leading causes of fire in the community in which the teaching is to be done is an indispensable factor in any teaching program. This survey may be prepared with the assistance of the students and the local fire department, but above all it should be *localized* and not represent a mere "rehash" of national statistics. Furthermore, such a survey should be made at definite intervals, for different seasons of the year give rise to new hazards. For example, it has been found in Los Angeles that defective flues, overheated stoves, and faulty heaters are a major cause of home fires during the winter, while the summer season brings the danger from open burning, dry grass, defective incinerators, and worn-out spark arrestors.

A survey could be made of the fire problem in the home, on the farm, in the school, in recreation, and in industry. Home fires should be given extra consideration due to the fact that 73 per cent of the loss of life from fire occurs in the home. Startling as it may seem, people are better able to get out of public buildings, such as churches, theaters, and office buildings, than they are from their own homes in case of fire. There is a greater need for a fire exit drill in the home than in most public buildings, for the latter are generally required by law to have exit doors that swing outward, exit lights, fire escapes, et cetera, but not so the home. There remains the hope, of course, that the habits acquired in school fire drills will be carried over into the home.

NEARLY everyone is familiar with the everyday causes of fires in the home, but it might be well to have students prepare a list of possible causes of fire that are likely to originate in each room of the home, including in such a list the possible sources of burns. For example, fires in the living room have been caused by frayed electric lamp cords, extension cords running under rugs, overloaded electric outlets, short circuits in radio, defective heaters, loose or worn gas tubing, embers from the fireplace, and so on. Burns, sometimes fatal, have been caused by clothing set on fire by a heater. Children have stumbled into an open fireplace. One baby with a damp diaper was killed in a living room by sitting on a worn electric light cord; another, by inserting a hairpin into an electric wall plug.

As an aid to determining the sources of burns that occur in the home, the Coroner's Annual Report may prove helpful. For instance, in Los Angeles County, last year's report showed that six children died as a result of playing with matches; twenty persons had their clothing ignited by a gas heater, seven by bonfires, four by cigarettes, two by

cleaning fluid, and one by an electric pad. Four persons who cleaned with gasoline were burned to death, and fourteen died because they couldn't get out of a burning building. The Coroner's Report also warns us that babies die as a result of turning on the hot water in the bath tub, falling into tubs of hot water, and pulling containers of hot fluids off the stove; that people die from scalds received under a shower when they turn the wrong knob. When the Coroner speaks, one need not merely guess the cause of fatal burns — one knows with *dead* certainty.

While glancing at the problem of home fires, there are certain questions concerning personal safety that should be taken into account. Does the student know what to do if his clothing should catch on fire? The answers received by the fire inspector from children in the primary grades explain the reason why the Coroner's report showed that thirty-four died last year in Los Angeles County alone because their clothing caught on fire. The most common replies are: "Run and jump into a tub of water!" "Run and jump into the bathtub!" "Run and jump into a fish pond!" and "Run and get the garden hose." Run! Run! Run!—and yet that is the worst thing to do. Why haven't the teachers told these youngsters? Is it because they assume that it is common knowledge that one should throw himself to the ground and roll, or is it possible that even the teacher has not thought of what he would do in such a situation?

Other questions are: What should one do if the house catches on fire? What is the best way to get out of a burning building? How does one notify the fire department? How does the fire alarm box work? What should one do until the fire department arrives? What fire equipment does the home have? A ladder? A garden hose that is kept attached? What should one try to save from a burning building in the way of personal property? It is significant to note that firemen, upon arriving at the fire, usually find the occupant throwing lamps, clocks, and pictures from the second-story windows and then bump into him on the stairway, carrying blankets and pillows in his arms.

BUT the home presents only one phase of the fire problem; society has set up certain fire controls for school, recreation, and industry as well.

Laws have been passed to set a standard of care for the maintenance and operation of our schools, and any conduct which falls below such standard gives rise to actionable negligence.

Let us glance at a few of the requirements applicable to our Los Angeles schools. Whether public or private, elementary or secondary, and whether its main purpose is to teach ethics or permanent waving, every school must have buildings equipped with interior standpipe and fire hose of sufficient length to reach all portions of all floors; all main exit doors must be equipped with panic locks, and all doors must swing outward; unless it has a door five feet wide, all classrooms must have two doors which can be opened from the inside without the use of a key, even when locked from the hall side; teachers are committing a crime who obstruct any door or hallway, whether by means of easels, tables, desks, or otherwise; all schools having upper floors or basements must have two stairways at least five feet wide and equipped with handrails,[3] and so on. The Rules and Regulations of the State Board of Education require that principals conduct a fire drill once a month, and every school in the State is governed by a State law which prescribes the uniform manner

[3] *Municipal Code of the City of Los Angeles*. Sections 91.250-91.258; the above ordinances went into effect January 23, 1927.

of sounding a fire alarm, so that, even if a whistle is used to give the signal, the teacher must blow it in the uniform manner.[4]

Another phase of fire prevention that the teacher must not overlook is the fire problem involved in recreation. The common practice at present is for the teacher to give the class a few general safety warnings just prior to any holiday or vacation period. If a fire precept is mentioned at all, it is generally, "Don't play with matches." While it is true that playing with matches is a somewhat prevalent activity among the little folks, it is far from being the only hazardous recreation.

The usual question asked by everyone when time for recreation is available, is, "Where shall we go?" Going some place involves transportation; but how many autos are equipped with fire extinguishers? And yet, because gasoline and a source of ignition are always present, the auto accident involving fire is not at all infrequent. Buses, trains, and even street cars have been known to have fires, and in such cases there is not only the problem of adequacy of extinguishers and how to use them, but also the very important question of how to get out of the vehicle alive in the face of possible panic or a door that will not open. Whether one goes to the recreation halls of the beach and mountain resorts, or merely to the local theater, the fire problem accompanying places of public assemblage is ever present.

"Be careful of the campfire" is a common warning, but one that is too superficial. The Department of Agriculture of the United States has enacted camping rules which carry as high as a two-year sentence at McNiel's Island, should one be convicted of their violation, and these rules have been adopted in substantially the same form by the state forester and the county forester of Los Angeles.[5]

The secondary school with its multifarious shops offers an excellent opportunity for presenting the fire problems found in industry; on the shop instructor, then, falls the responsibility for acquainting the student with the many safety precautions relevant to that trade, and by no means unimportant are those relating to the control of fire. The instructor's attention should not be limited to the present danger of accident to the student, but some attempt should be made to point out to him that type of hazards and problems that he will be confronted with as an employee of a large plant.

WHILE only narrow aspects of the problem as it appears in the home, school, recreation, and industry have been touched upon in this article, yet they give a fairly representative cross section of the vast field that teachers are expected to be familiar with, and even the less astute will recognize the fact that, without assistance, teachers can hardly be expected to fulfill adequately the duty imposed upon them by our fire prevention statute. A step that would immeasurably contribute toward accomplishment of the purposes of this statute would be achieved through the state-wide adoption of a safety curriculum in which the fire problem receives its proportionate share of emphasis; as a last resort, something might even be done about the law requiring the State Board of Education to adopt such rules and regulations as it may deem necessary to secure the adoption of a course of fire prevention in the public schools; so far, the Board has not deemed it necessary to enact any such

[4] These are just a few of the items found in the *Fire Inspection Handbook for Schools* which was compiled by the School Detail of the Los Angeles Fire Department for the guidance of principals and custodians in our Los Angeles schools.

[5] See regulations T-1 and T-2 adopted by the Secretary of Agriculture of the United States under the authority provided for by the Act of Congress of June 4, 1897; *Hazardous Fire Area Act* (California Statutes, 1929, Chap. 115), Section 3.

rules. It is to be preferred, however, that fire prevention be taught, not as an isolated subject, but in relation to all the activities that make up the life of the school. As well as being integrative, it is desirable that the teaching be continuous and cumulative, with local needs placed foremost.

But it is not within the province of this article to deal with curriculum structure and teaching methods; if, through pointing out the scope of the fire problem with its ever widening horizon, the need is shown for increasing activity on the part of our curricula draftsmen in this particular field, this exhortation will have achieved something. In the meantime, the teacher is where we started, in need of assistance to carry on this duty imposed by law, for in this day of technological complexity the fire problem is becoming proportionately complex.

One suggestion is that the teacher call upon the local fire department for what it has to offer. In Los Angeles, a School Detail has been created as part of the Fire Prevention Bureau of the Fire Department, and it serves the school in many ways. Domestic science teachers in junior and senior high schools regularly call upon one of its members to give lectures on kitchen safety, in which the proper way to light an oven, to take off the lid of a teakettle, to avoid dust explosions, to put out a clothing fire, to light a match, et cetera, are shown; some chemistry teachers request a fire extinguisher lecture and demonstration, in which the underlying principles of use and operation of the extinguisher are shown in the school laboratory to as many as five or six classes a day; physical education instructors often call upon them for a demonstration of the fireman's "lifts" and "carrys" as well as the equipment that firemen use to supplement artificial respiration.

In addition, the School Detail is always ready to take part in any safety program in the school, with sometimes all four of its members participating in a demonstration. The most popular of the out-of-door shows is the extinguishing of the various types of fires, built on the school grounds, by means of the appropriate type fire extinguisher. In the auditorium many requests are answered for the showing of sound motion pictures—ones depicting the hazards of mountain fires, Fourth of July, home dry cleaning, and such related subjects.

Teachers should also avail themselves of the services of student organizations, such as fire brigades and safety councils. In one of the Los Angeles high schools[6] the Fire Department of the school conducts the fire drills, sponsors assemblies and fire prevention programs, gathers current fire items for the school paper, makes periodical inspections of the school buildings, and in many other ways renders assistance to the faculty in the fire problem.

[6] The John C. Fremont High School.

Vocational Education Being Extended

Vocational schools and classes throughout the country, receiving additional funds authorized by the George-Deen Act, will enroll more than 2,000,000 youths and adults this year—adult farmers, homemakers, tradesmen and industrial workers, apprentices working in factories, young people from the farm. Local and state surveys, analysis of vocational education needs by committees, and closer coördination of vocational education with general education have strengthened the program. During the 1938-39 school term education in the distributive occupations and training for public service was developed to make vocational education more effectual. A newly-organized Office of Education occupational information service is endeavoring to supply much-needed data regarding job opportunities, training needs, and the like.

The Mathematics of Safe Driving

By NEWMAN C. BORDEN

A MATHEMATICAL approach to the problem of safe driving can contribute much toward accomplishing the aims of safety education in that area. Such an approach has many advantages, not the least important of which is the fact that this integration of safety instruction with the work in one of the subject matter fields represents a most desirable method of approach in safety education. It might be mentioned, incidentally, that the author, from his experience as a teacher of mathematics, has found that problems such as are presented here stimulate pupil interest in the study of mathematics.

This article consists almost entirely of a series of problems which bear on the problem of automobile safety and which are illustrative of the type of exercise which can be developed. It will be noted that an effort is made in these problems to go beyond the mechanics of mathematical calculation, this being accomplished by including for most problems several questions designed to bring home to the student the safety implications present in the various situations presented.

This article represents an important part of the safety education symposium, for not only is its content such that it will make a contribution to the course content of many classes, but also it demonstrates the most satisfactory method of offering safety instruction—that of making it a part of the classwork in all courses.

Mr. Borden, who has prepared these problems for the algebra class, is a teacher of mathematics in the Beverly Hills High School, where he has been for the past four years. For the last three years he has served as the representative from his school on the Safety Committee of the Los Angeles County secondary schools. While serving in this capacity he wrote a monograph entitled "Teaching Traffic Safety," which was published by the Office of Los Angeles County Superintendent of Schools. During the past year he has served as a member of a committee of three appointed to suggest materials and methods which might be used effectively in the safety offerings of the secondary schools of Los Angeles County.

Before presenting the problems it is necessary to include a few definitions:

Braking Reaction Time. The time it takes a driver to get his foot on the brake after he has seen a need for stopping is called the driver's braking reaction time. The braking reaction time of the average driver is about 0.75 second.

Reaction-Time Distance. The distance a car travels during the interval between the instant the driver sees a danger and the instant he puts his foot on the brake is his reaction-time distance. In other words, reaction-time distance is merely the distance traveled during the driver's braking reaction time. Of course, this distance becomes greater and greater as the speed of the car increases.

Braking Distance. The distance traveled by a car from the instant the brakes are applied until it comes to rest is called braking distance. A table of braking distances is given below.

The values given here are average braking distances and were obtained under average road conditions by cars having good brakes.

TABLE OF BRAKING DISTANCES

Speed (M.P.H.)	*Average Braking Distance (Feet)*
10	7
15	14
20	24
25	37
30	54
35	74
40	97
45	122
50	148
55	175
60	215

Shorter braking distances are possible when ideal road conditions exist and when the brakes are the best obtainable. Much longer braking distances occur when the road is slippery or when the brakes are in poor condition.

Total Stopping Distance. The distance a car travels from the instant the driver sees a danger until he brings the car to rest is called the total stopping distance. In other words, it is the reaction-time distance plus the braking distance.

THE first group of problems presented below are designed for use in general mathematics classes.

PROBLEM 1

In order to fill in the chart below, you must know how to change miles per hour into feet per second. *Hint:* 10 miles per hour means 10 miles divided by 1 hour, or $\frac{10 \text{ miles}}{1 \text{ hour}}$ Why will $\frac{\text{m. p. h. x } 5{,}280}{1 \times 3{,}600}$ give the speed in feet per second?

Reaction-Time Distances

Speed (M. P. H.)	*Braking Reaction Time in Seconds*								
	0.30	*0.40*	*0.50*	*0.60*	*0.70*	*0.75*	*0.80*	*0.90*	*1.00*
10									
15									
20									
25									
30									
35									
40									
45									
50									
55									
60									

Questions on Problems 1 and 2

1. As you will notice from your charts, when the speed is doubled the reaction-time distance is twice as great. Why, then, is the total stopping distance at 60 miles per hour more than twice that at 30 miles per hour?

2. From the results of your work on stopping distances, do you see that the speed laws are really the results of scientific measurement and are designed to protect the public against ignorant and thoughtless drivers? Or do you still think, as many do, that the purpose of the speed laws is to gain revenue for the city and state?

3. Science has shown that practically nothing can be done to improve one's reaction time. It follows that one's reaction-time distance can be shortened very little for any given speed. Since total stopping equals reaction-time distance plus braking distance, will you

PROBLEM 2

From the table of braking distances and from the table you prepared in Problem 1, complete the chart below. Use 0.75 second for braking reaction time.

Speed (M.P.H.)	*Speed (Feet per Second)*	*Reaction-Time Distance (Feet)*	*Braking Distance (Feet)*	*Total Stopping Distance (Feet)*
10				
15				
20				
25				
30				
35				
40				
45				
50				
55				
60				

remember how important it is to have your brakes checked regularly when you learn to drive?

4. Fatigue, alcohol, old age, and lack of attention have been proven to lengthen reaction time. Does this show you why drunk drivers should be dealt with severely, why it is unwise to drive when tired, especially at high speed, why elderly drivers can speed with even less safety than young drivers, and why it is important to keep one's eyes and mind solely upon one's driving while at the wheel?

5. When you learn to drive, will you try to keep in mind what you have learned about your reaction time and about the distances required to bring your car to a stop from various speeds? All good professional drivers remember these things.

PROBLEM 3

A car is traveling 30 miles per hour through a residential district. About five car lengths ahead, a small child suddenly darts out from between two parked cars. Assuming normal braking reaction time and good brakes, will the driver stop in time, or in order to miss the child will he be forced to crash into an oncoming car or one that is parked? Use fifteen feet as the car length. Of course, you will have to use the table of braking distances.

Questions on Problem 3

1. Does this problem bring out a reason why the speed limit in residential sections is usually 20 miles per hour and is never more than 25 miles per hour?

2. Do you see that in an emergency the driver faces the necessity of choosing between various courses of action in a split second?

3. Does this problem show the danger of stepping out into the street from between parked cars?

4. When you learn to drive, wouldn't it be helpful for you to keep in mind your own total stopping distances at various speeds in terms of car lengths?

PROBLEM 4

The maximum visibility obtainable with properly focused headlights is about one hundred and fifty feet. If a driver with average braking reaction time is driving 50 miles per hour in a car with good brakes, can he stop in time to avoid an unlighted object ten car lengths ahead of him (one car length is fifteen feet)?

If your figures show that your answer to the first question is "no," how

many additional car lengths would be required to stop the car? In other words, by how many car lengths does his total stopping distance exceed the range of his lights?

From what you know about the reaction-time distance of the average driver and the braking distance of the average car, show that 35 miles per hour is actually the maximum safe speed at night.

After looking into the undimmed driving lights of an oncoming car, one is practically without sight for two seconds. How far would the car travel during this time?

Questions on Problem 4

1. Do you now understand better why the law requires lights on all vehicles when traveling at night?
2. Do you see now why the law requires drivers to dim their driving lights when approaching each other?
3. What are you going to tell Dad the next time he puts the car up to 50 miles per hour on the highway at night?

Problem 5

The following chart, which summarizes the cost of driving at various speeds, is taken from figures obtained by a large insurance company. The figures on gasoline, oil, and tire costs were obtained from large companies producing these commodities. The maintenance costs are based on the experience of operating a fleet of more than 300 state-owned vehicles. The table shows the various costs per 1,000 miles for the average car with an average driver traveling on average roads.

Miles per Hour	*25*	*35*	*45*	*55*	*65*
Oil	0.5 qt. 13c	1 qt. 25c	1.75 qt. 43c	3 qt. 75c	4.5 qt. $1.13
Gasoline	50 gal. $8.75	55 gal. $9.63	60 gal. $10.50	69 gal. $12.08	80 gal. $14.00
Tires	$1.50	$3.00	$4.50	$7.50	$10.50
Maintenance	$4.00	$5.00	$6.60	$10.00	$13.00
Total Cost					
Cost Per Mile					

Fill in the blank spaces under "Total Cost" and "Cost per Mile."
Fill in the blank spaces in the chart below.

Speed	*Increase in Cost Per 1,000 Miles*	*Time Saved in Hours*	*Cost Per Hour of Time Saved*
35 to 45			
35 to 55			
35 to 65			
45 to 55			
45 to 65			
55 to 65			

Questions on Problem 5

1. Since increases in speed from 35 to 45 miles per hour and from 55 to 65 miles per hour both represent an increase of 10 miles per hour, one might think that the time saved would be the same in both cases. Did you find this to be true? Did you find the increase in cost per hour in time saved to be the same in both cases?

2. A car traveling 65 miles per hour is capable of delivering a blow two and one-half times as hard as that which it could deliver at 45 miles per hour. When you couple this fact with the great difference in the costs of driving at these speeds, do you think that the time saved in traveling 1,000 miles is worth the increases in cost and risk which accompany a speed of 65 miles per hour?

NEXT comes a group of problems planned for the algebra class. In addition to being used in first-year algebra, the work presented below may also be used in the customary review of first-year algebra which is contained in the second-year algebra course. The starred questions, dealing mostly with variation, are intended only for second-year algebra students.

PROBLEM 1

Centrifugal force is the force that acts to push a car off the road when it is rounding a corner. The force of friction between the tires and the road fights to keep the car from being shoved sideways; however, sometimes the contest is so unequal that the centrifugal force not only causes the car to skid but may even succeed in overturning it.

The formula $F = \frac{WV^2}{32R}$ carries some very important information to the driver of an automobile. In this formula, F is the centrifugal force in pounds exerted upon a car weighing W pounds and which is traveling at a speed of V feet per second around a curve of radius R feet. The number 32 is the gravity factor which you will learn about when you study physics.

Fill in the chart by using the above formula. The results will show you what happens to the centrifugal force when a car traveling at a constant speed turns curves which vary in sharpness, that is, curves having different radii. Use 3,000 pounds as the weight of the car, and 30 miles per hour as the speed. Remember that the formula calls for the speed in feet per second.

Radius (Feet)	*Centrifugal Force (Pounds)*
100	
200	
300	
400	
500	

PROBLEM 2

Fill in the following chart by using the formula for centrifugal force. The results will show you what happens to the centrifugal force when a car travels around the same curve at various speeds. Use 3,000 pounds as the weight of the car and 500 feet as the radius of the curve. Remember that the formula calls for the speed in feet per second.

Speed (Miles Per Hour)	*Centrifugal Force (Pounds)*
20	
25	
30	
40	
50	
60	

Questions on Problems 1 and 2

1. Do you see why it is very important to govern the speed of a car according to the sharpness of the curve it is about to turn?

2. Do you see that a speed sign on a curve is placed there to tell you the safe speed at which the curve may be taken?

3. Since the force that opposes centrifugal force is the friction exerted between the tires and the road, do you understand why it is necessary to check frequently the condition of the tires?

4. The force of friction between the tires and the road is decreased greatly when the surface is wet; this is especially true if the tires are worn smooth. Is it clear, then, that it is important to have tires with good treads for wet weather driving?

5. Some drivers reason this way: "The force trying to shove my car off a curve at

40 miles per hour must be twice that at 20 miles per hour, because the speed is just twice as great. Likewise, the force acting at 60 miles per hour must be 3 times that at 20 miles per hour." How do you account for the discrepancy between this reasoning and the results you obtained in the problem?

PROBLEM 3

You know that when an object falls through space, it continues to gain speed until it hits the ground. The pull of the earth on the object is responsible for this increase. Scientists have found that neglecting the retarding force due to air friction, the speed of a freely falling body will increase about 32 feet per second for each second that it falls. This increase in speed is called the acceleration due to gravity. This is the gravity factor (g) that you have encountered in some of the previous problems.

In physics you will discover many interesting facts about falling bodies. One of them is stated by the formula $h = \frac{V^2}{2g}$, in which h is the distance in feet per second; g is numerically 32.

Most of us hardly dare to think of the terrible consequences that would result if we were to drive over a cliff 121 feet high. Yet, many of us think nothing of stepping our speed up to 60 miles per hour on the highway. A fall of 121 feet would result in a car's striking the ground with a speed of 88 feet per second, or 60 miles per hour. The energy absorbed in this crash would be exactly the same as that absorbed in any crash which would stop a car of equal weight traveling at 60 miles per hour on the highway.

In applying the formula to the following problem, you will discover how far a car would have to fall in order to obtain the given speeds.

Fill in the chart below. Remember that V must be expressed in feet per second, and that g is 32.

V *Miles Per Hour*	h *Feet*
20	
30	
40	
50	
60	
70	

PROBLEM 4

Experiments have shown that the maximum rate at which a car may safely be slowed (decelerated) is about 22 feet per second for each second that the brakes are applied. A more rapid slowing down endangers the safety of the passengers. This is due to the fact that at the instant the brakes are applied the car begins to slow down, but the passengers tend to continue to move forward at the original speed of the car. This is why you have to brace yourself strongly to avoid being thrown against the dashboard when the brakes are applied suddenly.

The more sudden the stop, the stronger is the tendency for the passengers to be thrown forward. Due to this fact, it is not uncommon for a person to be thrown through the windshield in a serious collision.

The formula $S = \frac{V^2}{2a}$ will tell you the number of feet a car S traveling at V feet per second will go if it is slowed down at the rate of a feet per second for each second that the brakes are applied. As has been stated above, for safety a should not be numerically greater than 22. Use this value in the following problem:

Fill in the below table. Remember that V must be stated in feet per second before it is substituted in the formula.

V *Miles Per Hour*	S *Feet*
20	
30	
40	
50	
60	

Some New Light on Human Intelligence

By GEORGE D. STODDARD

IN terms of practical outcomes in human betterment, *nature* and *nurture* becomes *eugenics* and *euthenics*.

The Standard Dictionary defines *euthenics* as "the science of improving the human race by external influences, apart from considerations of heredity." Since heredity refers explicitly to factors carried in the genes, it is clear that eugenics and euthenics, as a team, must pull the entire load of progress in human growth and behavior. But it can be seen at once that the team is a pair of Siamese twins: they have no separate existence. There is no nature in a vacuum of nurture; no nurture working upon putty-like materials completely responsive to its measured impacts.

Nothing is simple for the worker, either in genetics or euthenics, but at the present time it appears that these two fields are beginning to throw new light on human intelligence.

Work in human genetics is complicated by the difficulty of a direct approach. Take away the elusive art of analogy, and what do you have left? Tons of data on the wild fruit-fly, gathered under standardized conditions over countless generations, do indeed establish a mechanism of heredity in the physical aspects of this invaluable creature, but they do not give us direct testimony on human behavior.

The work leading to such discoveries has been brilliant and dramatic—let no one underestimate its importance in the grand science of experimental biology—but eventually we may expect scientific evidence and concomitant theory to reach beyond physical structure and physiological function to the simpler behavior, perhaps reflexive in character, of the lower organisms. How far it may reach into the complex behavior, say intelligence, of a complex animal such as man, of course no one can foretell.

It is certainly true that the talented inherit appropriate potentialities. The very fact that they are talented indicates, in a circular fashion, that they could have been talented. But this does not say that their parents were talented or

Dr. Stoddard, who summarizes in the present article the more recent progress in the field of human intelligence, is dean of the Graduate College and professor of child psychology, University of Iowa. Since 1929 he has been director of the Iowa Child Welfare Research Station at the University, where important contributions have been made, particularly in the form of studies of the effect which changed environment has on the intelligence of children. Dr. Stoddard is the author of some six or seven important texts in the field of education and psychology, the most recent being his "Manual of Child Psychology," published in 1936 with the collaboration of Beth L. Wellman. He has written very widely in the field of tests and measurements and in child psychology. At the present time he is a member of the important Problems and Plans Committee of the American Council on Education.

This article is adapted from an address given by the author at Wheeler Hall on the University of California campus July 13, 1939.

that their children will be talented; nor does it indicate what proportion of their talent was ascribable to hereditary factors.

Talents can ordinarily be hung on some framework as follows:

1. Hereditary factors (those carried in the genes).
2. Constitutional factors (characterizing a specific individual, but not carried in genes and not a resultant from social pressures; *e. g.*, prenatal hemorrhages, endocrinal relationships).
3. Environmental factors (nutrition, stimulation, and education).

I should regard intelligence as always an emergent from factors 1, 2, and 3 above, with full recognition that any one of these factors may vary from almost negligible to almost crucial strengths. Thus any gene-carried tendency toward microcephaly will result in feeble-mindedness regardless of the pressures of 2 and 3, but potential genius may be unlucky in 2 and pathologically depressed in 3 so as never to emerge in the individual. Even as we go toward the central tendencies of the distributions of these factors, we get results that are complex, unpredictable, and perhaps truly indeterminate.

Of course neither feeble-mindedness nor genius can be controlled by paying attention only to the extremes of a population distribution. H. S. Jennings estimates that, if one were to assume that a single gene could carry a feeble-mindedness taint, there are thirty times as many individuals with this gene as there are feeble-minded persons. Thus, even to a geneticist, the mass of feeble-minded, as well as of genius, arises out of the mass of the people. Nevertheless the segregation of the feeble-minded, the criminal, the insane, on a combination of genetic and social grounds, is one procedure on which we may all agree. It cannot, of itself, solve our great social problems down through the generations, but it is humane and helpful.

Here again, Jennings, who is a distinguished Johns Hopkins zoölogist, points to the intricate nature of the problem. To quote:

> Under certain conditions, a given set of genes may produce a defective individual; under other conditions, a normal one. The defectiveness of the individuals could therefore be prevented either by starting them with a different set of genes, or by changing the environment in which they develop. In the fruit fly, defectiveness of a certain gene produces under ordinary conditions an abnormal structure of the abdomen. But if the individuals are kept in a dry atmosphere, the abnormality does not appear. A change of environment has prevented the effects of a defective gene. . . . . Essentially the same in general principle is the effect of education, training and the like, in changing the behavior that would without it result from the genes present in the individual. In some of these matters the effects of genes and environment are inextricably intermingled. Behavior is bound to be relative to environment; it cannot be dealt with as dependent on genes alone.[1]

It may be said that until comparatively recently the euthenic approaches to these human problems seemed almost as hopeless as the genetic. There was much to justify the old Biblical morality about the sins of the fathers being passed on to the sons, generation after generation. The poor, the unlettered, the stupid, the starved remained in this primitive state so consistently, so downright wilfully, that it appeared plausible to postulate gene-carried factors, strong in their enduring ability to produce weaklings.

But there have been straws in a counter-wind, and some of them have blown from over the rolling plains of Iowa.

WE have, for example, the work of Harold M. Skeels, of the Iowa Child Welfare Research Station, on the progress of illegitimate children.[2] Dr. Skeels has been faced with practical

1 H. S. Jennings, *The Biological Basis of Human Nature*, W. W. Norton and Company, New York, 1930, p. 229.

2 Harold M. Skeels, "Mental Development of Children in Foster Homes," *Journal of Consulting Psychology*, 2:33-45, March-April, 1938.

problems concerning the placement and adoption of such children.

In regard to the work of the Iowa Child Welfare Research Station the following quotation will throw some light:

Data may be reported on 147 mothers, with Stanford-Binet IQ's available for 78 of these 147. For this group of 78, the mean IQ was 87. Thirteen per cent had IQ's above 100; 28 per cent had IQ's below 80. The educational and socio-economic status was the same as for the whole sampling of 147. The fathers of the illegitimate children were known. Thirty-seven per cent of these true fathers fell in the lowest occupational class, day laborers and unemployed. The lowest three classes (reaching into the semi-skilled occupations) accounted for over 80 per cent of all the true fathers.

These children were taken from their mothers at birth or shortly after and placed in good homes, as judged by qualitative criteria. Such items as vocational security, cleanliness, freedom from excessive debt, standing in the community, and general social competence were taken into consideration. The illegitimate children were placed in the foster homes at an average age of 2.7 months, all being placed before the age of six months.

After a lapse of time, varying from one and a half to six years, with a mean of two years, these children were measured by the Kuhlmann revision of the Binet tests. *The mean IQ was 116.* Sixty-five per cent of the group had an IQ of 110 or above and 41 per cent an IQ of 120 or above. There were no children under IQ 80.

Later on, when the children were at an average of four years and four months, Skodak [3] reassembled this sampling for further testing. At that time a mean IQ of 112 was reported for the group.

In a supplementary study, Skodak [4] made an intensive inquiry into the development of sixteen children whose mothers were definitely feeble-minded. (The number now includes 30 children of feeble-minded mothers, with similar findings.) This diagnosis of feeble-mindedness was based not only on intelligence test results but on the school, occupational, and social adjustment of the mothers. The mean IQ of these mothers was 66. The families of the sixteen children were characterized by frequent appearance of welfare offices, with considerable institutional contact.

These children were placed in infancy in foster homes ranking somewhat above the average in socio-economic status. Subsequently they were given individual Binet tests, first at an average age of two years for purposes of the records at the time of adoption, and again at a mean age of four years and four months. On the first examination a mean IQ of 116 was obtained. The range was from 95 to 131. On the second examination, from one to three years later, the sixteen children had a mean IQ of 108, with a range from 81 to 132. The eight children in foster homes of the upper three occupational classifications had a mean IQ of 111 on second examination. Hence it may be said that the IQ's of the children of the sixteen dullest mothers in the whole group were not markedly different than those of the other children.

It would be incorrect to suppose that a general upward trend characterizes IQ's at these age levels. Rather we have substantial evidence that under certain conditions there is a constant shift downward. For example, in the work of Crissey,[5] 988 different children residing in orphanages and other state institutions were subjected to a careful analysis. In general it was found that a steady IQ loss is associated with long residence in the institution.

There have just been published in the Station the results of a three-year study [6] carried out in one of our state orphanages. The sampling consists of the entire preschool age population of the orphanage, divided into two matched groups of twenty children each at the start of the experiment. One group was retained as a control group and carried on the normal life of the orphanage for children of this chronological age. This life may be summarized as rather impoverished on the educational and social side. The experimental group was placed in a new preschool which had been designed and supervised by Station staff members.

What we have, then, over a three-year period, is a comparison of the development of two matched groups of children, the one in the nonstimulating atmosphere of a large orphan-

[3] Marie Skodak, *Children in Foster Homes: A Study of Mental Development*, University of Iowa Studies, Studies in Child Welfare, Vol. 16, No. 1, 1938.

[4] Marie Skodak, "The Mental Development of Adopted Children Whose True Mothers Are Feeble-Minded," *Child Development*, 9: 303-308, September, 1938.

[5] Orlo L. Crissey, *Mental Development as Related to Institutional Residence and Educational Achievement*, University of Iowa Studies, Studies in Child Welfare, Vol. 13, No. 1, 1937.

[6] Harold M. Skeels, Ruth Updegraff, Beth L. Wellman, and Harold M. Williams, *A Study of Environmental Stimulation: An Orphanage Preschool Project*, University of Iowa Studies, Studies in Child Welfare, Vol. 15, No. 4, 1938.

age, and the other in the social climate of a fair, but not excellent, nursery school. Apart from the preschool attendance, there was no difference in the lives of the children. They resided in the same cottages, ate in the same dining rooms, and experienced the same general supervision.

It was found that the general pattern of IQ for these two groups varied significantly. Such variation was not in evidence over a period of less than four months. In the interval of residence from 200 to 399 days, the preschool children gained 3.7 points in IQ while the control group lost 1 point. For 400 or more days of residence, the preschool children gained 4.6 IQ points and the control group lost 4.6 points.

When we turn to children who are much different in socio-economic level and in their general mental status, analogous IQ changes can be shown to take place. In Wellman's first study [7] of over 600 children who had gone through the preschools of the Station, she showed that over the four years of attendance there was a significant gain in IQ.[8]

We are asked, have we changed the hereditary endowment of these children? And the answer is *no*, or, more precisely, *we have no knowledge of that*. What did they get from heredity in the first place, by way of a contribution to intelligence? We do not know. It is well known that heredity does not presuppose likeness; it may also produce unlikeness. Obviously there are many children who, by reason of factors hereditary, constitutional, or environmental, are so caught in feeble-mindedness as never to emerge.

It is to be noted that none of the work reported here reduces variability. Under good conditions members of the group as a whole tend to move upward intellectually, but not to close in on each other. Environment, like a good pacemaker, may step up the tempo, without bunching the competitors.

What has been said of intelligence, applies in a general way to other forms of human behavior. Keister[9] found that children could be taught to react in a friendly and constructive way to repeated failure. Considering the rôle of frustration, feelings of inferiority, and aggression in the growth of human personality, one should regard this as a major discovery. Similarly for the work of Jack[10] and Page[11] in the Station. Is submissiveness on the one hand, or ascendance leading to bullying, an inborn, or at least highly stabilized, trait in the young child? Apparently not. These latter two investigators succeded in moving the "coward" and the "terror" toward the golden mean of social behavior, and the change of ways was neither superficial or ephemeral.

Finally, in the work of Kurt Lewin[12] and his associates we have a new concept of the social forces playing upon the child. Democracy, autocracy, laissez-faire, anarchy—to the child these are not just political catchwords, but meaningful, dynamic frameworks within which he must find his character, his achievement, and his adjustment. And the evidence points to a substantial superiority for the truly democratic life—at home, at school, and at play.

TO the great Binet, thirty years ago, nothing that we are now doing along environmental lines would have appeared strange. In his remarkable book

7 Beth L. Wellman, "The Effect of Preschool Attendance Upon the IQ," *Journal of Experimental Education*, 1:48-69, December, 1932.

8 George D. Stoddard, "The IQ: Its Ups and Downs," *Educational Record* (Supplement), 20:44-57, January, 1939.

9 Mary Elizabeth Keister, "The Behavior of Young Children in Failure: An Experimental Attempt to Discover and to Modify Undesirable Responses of Preschool Children to Failure." In *Studies in Preschool Education, I*, by Ruth Updegraff, Mary E. Keister, Louise Heiliger, et al., University of Iowa Studies, Studies in Child Welfare, Vol. 14, 1937, pp. 29-81.

10 Lois M. Jack, Elizabeth Moore Manwell, Ida GaarderMengert, Esther Van Cleave Berne, et al., *Behavior of the Preschool Child*, University of Iowa Studies, Studies in Child Welfare, Vol. 9, No. 3, 1934.

11 Marjorie Lou Page, *The Modification of Ascendant Behavior in Preschool Children*, University of Iowa Studies, Studies in Child Welfare, Vol. 12, No. 3, 1936.

12 Kurt Lewin, "Experiments in Social Space," *Harvard Educational Review*, 9:21-32, January, 1939.

entitled *Les Idées Modernes Sur Les Enfants,* Binet devotes a long chapter to the topic "Intelligence: Its Measurement and Education." He complains that he has found a prejudice against the educability of the intelligence. To quote in free translation:

> Some recent philosophers appear to have given their moral support to the deplorable verdict that the intelligence of an individual is a fixed quantity, a quantity which cannot be augmented. We must protest and act against this brutal pessimism. We shall endeavor to show that it has no foundation whatsoever.[13]

Binet then cites various observations and experiences in the teaching of subnormal children, summing up his final verdict as follows:

> A child's mind is like a field for which an expert farmer has advised a change in the method of cultivating, with the result that in place of desert land, we now have a harvest. It is in this particular sense, the only one which is significant, that we say that the intelligence of children may be increased. One increases that which constitutes the intelligence of a school child; namely, the capacity to learn, to improve with instruction.[14]

At long last American psychologists are shaking off their concepts of a rigidly fixed rate of mental growth. They are returning to the teachings of Alfred Binet. The results are highly encouraging to both psychologist and educator.

[13] Alfred Binet, *Les Idées Modernes Sur Les Enfants,* Ernest Flammarion, Paris, 1911, p. 141.

[14] *Ibid.,* p. 146.

English Teachers Need Life Experience Outside Their Jobs

The most important thing for English teachers to do as part of their preparation is to get a job or jobs in some entirely different field for a year or more, Dr. Malcolm MacLean, director of General College, University of Minnesota, said at the convention of the National Council of Teachers of English, held in St. Louis, November 24–26, 1938.

"English teachers more than most should have an experience of life outside their jobs," he said, "because it is their task to interpret all the many aspects of human life as seen through the eyes of writers. We English teachers tend to spend twelve years in school, transfer immediately to college or university, go from that into graduate school, and thence directly into teaching. In consequence, an abnormally large proportion of our lives is devoted to vicarious experiences instead of real. Little wonder that our teaching of literature is unreal, distorted, and perhaps fantastically so.

"Many of us form the bad habit of herding primarily with other English teachers. At faculty meetings, because there are so many of us and because we speak with some facility, we often tend to dominate other faculties. The breaking of this habit means the smashing of the clique spirit, and the continuous drive to come to know, to work with, and to understand teachers in other fields, as well as men and women in other occupations."

Postponing Algebra Until the Senior High School

By WILLIAM B. BROWN

THE current movement to reorganize the curriculum of the high school is being accompanied, especially in the last year or two, by a reconsideration of the place and content of mathematics. One aspect of this is the effort in some quarters to extend general mathematics through the ninth grade and to postpone algebra until the senior high school. Harl Douglass, dean of the School of Education at the University of North Carolina, reports that this movement is becoming quite general throughout the country.

For the past three years it has been a curriculum policy of the secondary schools of Los Angeles to move in this direction. While there has been no blanket ruling removing algebra from the ninth grade, principals and counselors have urged all except exceptionally mature pupils and those definitely interested in scientific and engineering careers to delay their study of the subject. There is still considerable algebra offered in Grade 9, but substantial progress has been made in the direction desired and there is every evidence that the trend will continue. There has been some opposition on the part of parents who have not understood the reasons for the change and on the part of some of the mathematics teachers who have felt that there is not sufficient justification for the policy. On the whole, however, principals and mathematics teachers have joined in furthering the deferment. The reasons underlying the policy are briefly outlined in the following paragraphs.

A first and fairly obvious argument for deferring algebra to the senior high school is that courses which are included in the high school for strictly college preparatory purposes should be postponed until as near the time of college entrance as possible. This follows the principle that learning should be as close as possible to the use and application of the knowledge studied, lest the laws of forgetting work to the disadvantage of the student. A recent study at the University of Iowa indicates that in one high school the great majority of pupils who had

In this article, Mr. Brown discusses a matter which is receiving the attention of more and more California secondary schools. In so doing he indicates the direction in which the Los Angeles City schools are heading and the reasons therefor. Mr. Brown is director of the Secondary Curriculum Section, Los Angeles. Before holding this position he was an assistant supervisor of social studies in the Secondary Curriculum Section, and before that he taught various ones of the social studies in Hollywood High School, University High School, and in Polytechnic Evening High School.

In regard to the present article he writes: "Much of the data is from unpublished studies and has been obtained by correspondence from W. L. Wrinkle, director of the High School at Colorado State College of Education, from Harl Douglass, dean of the School of Education, University of North Carolina, and from H. E. Benz, professor of education, Ohio University."

studied algebra in the ninth year had forgotten most of what they had learned by the time they reached the twelfth year.[1] It is probably safe to say that those who study algebra in the ninth grade will have forgotten most of it by the time they reach college unless there is considerable review and usage in Grades 10, 11, and 12. Inasmuch as most college preparatory students take only two years of academic mathematics, it should be feasible to program this work in Grades 10 and 11, or 11 and 12, and thereby provide a more effective preparation for college. This, of course, assumes that algebra is a desirable subject to take in preparation for college. There is some evidence to the contrary, to which reference will be made later. It is not the purpose of this statement, however, to present a case against algebra as a college preparatory subject.

A second argument favors deferring algebra on the ground that, since it is an abstract subject, greater mastery will be achieved if its study is delayed until pupils are more mature. It is well established that the ability to succeed, particularly in abstract types of study, increases with mental maturity—this applies particularly in the fields of mathematics and foreign languages. One aspect of this is borne out in the studies of Dr. E. F. Lindquist and others, which lead to the conclusion that as the intelligence quotient increases, ability to succeed in such abstract studies as algebra increases.[2] In this connection Douglass in *Secondary Education for Youth of Modern America* states that students with IQ's of less than 105 should not be enrolled for the study of algebra.[3] Lindquist found that a significant proportion of high school pupils are, by reason of mental ability, incapable of deriving enough value from elementary algebra to justify its being required of all pupils. The rate of failu is higher in algebra and geometry than in other fields.

Experimental developments for the past several years at the Colorado State College of Education have resulted in the delaying of algebra to the eleventh grade. Miss Kendall, a mathematics teacher in the high school connected with the college, summarizes her experience as follows:

1. There is a high positive correlation between scholastic aptitude of the student and his achievement in algebra and geometry.
2. Students in Grades 11 and 12 do a normal year's work in approximately one semester with markedly superior achievement.
3. At the eleventh grade level students understand algebra more readily and require much less teacher direction.
4. Older students who elect algebra do it with a more intelligent concept of purpose which eliminates the motivation problem.

Dr. Wrinkle,[4] director of the high school, concludes from the test data which they have available that the advantage of greater maturity has convinced them of the desirability of deferring algebra. He reports a study in the Greeley, Colorado, High School in which fifty-five of sixty-four students enrolled in algebra in Grade 11 exceeded the median of 15,000 students who were enrolled in algebra in Grade 9. The conclusion is warranted, we believe, that in the interests of a more successful mastery of the subject, algebra should be postponed so that we can take advantage of the highest possible mental maturity.

The argument of transfer of training is quite often used to justify the

1 Arthur K. Branham, *The Retention of Algebra by High School Seniors*, M. A. thesis, School of Education, University of Iowa, 1938.

2 See E. F. Lindquist, "The Gap Between Promise and Fulfillment in Ninth-Grade Algebra," *The School Review*, 42:762-771, December, 1934.

3 Harl R. Douglass, *Secondary Education for Youth in Modern America*, American Council on Education, Washington, 1937.

4 W. L. Wrinkle, *The New High School in the Making*, American Book Company, 1938.

retention of algebra in Grade 9. There is considerable evidence from numerous research studies to show that there is limited transfer of training from that year of algebra. However, this is one of the most difficult aspects of the problem to prove or disprove.

The argument is sometimes presented in opposition to postponing algebra that the subject is needed in Grade 9 for meeting the needs of the intellectually mature student. It is our contention that there is an abundance of social, community, health, and science problems and of applications of arithmetic to economic aspects of everyday life which can be brought into the school program in a sufficiently challenging and mature way to meet the intellectual needs of the superior students. The possibilities in this direction have not been fully explored as yet.

IF there are mathematics values which all high school students should have, then everything possible should be done to develop and extend a type of general mathematics which we will be justified in requiring or at least advising students to take. If we do not do something of this nature, we may soon find our liberal arts students graduating from high school without any mathematics above the eighth grade arithmetic. Mathematics plays an important rôle in life today. There is a definite need on the part of noncollege and liberal and fine arts college students for instruction in the application of arithmetic and simple algebra to the transactions of everyday economic life. The time has come for mathematics teachers to accept this challenge and take the lead in a reorganization of the high school program in the interest of a better general education for all. The excellent ninth grade mathematics texts which are available should provide encouragement to teachers and principals to increase the instruction in this area.

The paramount mathematical need of the average citizen is for greater knowledge of arithmetic than is now common. He uses very little algebra as an instrument of calculation. Deferring algebra to the tenth year gives the "nonspecialist" an opportunity at the ninth-year level to receive more of this all-important training in the everyday use of arithmetic.

It should be added here that undoubtedly there are values in algebra and geometry which can be utilized in meeting adolescent needs, but the present organization of these two subjects, as found in typical textbooks and courses of study, cannot be said to justify their general requirement for pupils who are planning to attend a liberal or fine arts college.

There is a definite tendency throughout the country for colleges to remove the algebra and also geometry from their admission requirements. This is part of a movement to liberalize entrance requirements and to substitute measures of scholastic ability for specific subject prerequisites. Reason for this change of attitude can be found in the results of a number of research studies which show that marks made in college seem to bear no relation to the pattern of subjects taken in high school.[5] The University of Wisconsin, Northwestern University, the University of Iowa, Iowa State College, University of Southern California, Leland Stanford University are among the schools which have removed the algebra entrance requirement for liberal and fine arts students. There is evidence that this movement is spreading to other schools in the country.

Teachers and principals who seek in their local situations exact scientific

[5] Harl R. Douglass, "Let's Face the Facts," *The Mathematics Teacher*, 30:56-62, February, 1937.

evidence to prove that deferment is desirable are bound to be disappointed. There are general principles of curriculum planning which provide a point of view justifying the change. These we have attempted to outline briefly. It probably never will be possible, however, to get exact proof. There are too many variable factors. Much of the proof will come after pupils enter college. As far as that is concerned, most of us would be at a loss to find sufficient proof to justify requiring any particular subject at any particular grade level in the school program.

But the conclusion does seem justifiable that for the great majority of college preparatory students, algebra should be delayed at least one or two years if we are to take advantage of the greatest mental maturity possible. We are convinced that this change is in the interests of a better preparation for college—provided further, of course, that algebra is a good subject through which to prepare for college. The final answer to this will be determined by the teachers of algebra and geometry themselves. They can make these two subjects a much more vital and valuable college preparatory experience than at present if they will revise and reorient their teaching to the life and problems of the boys and girls in their classes. It is most encouraging to note that an increasing number are attempting to move in this direction.

Evening Shop Classes Serve the Community

At the beginning of the last school year an adult evening shop course was organized at Weed High School for the first time. The purpose of the program was to serve the individual members of the community by making available the facilities of the school shop and the help of the instructor. The class was successful, even beyond expectations. New members enrolled continuously, until the capacity of the shop was taxed, and the class, conscious of the limited time, attacked its problems with enthusiasm.

Many kinds of furniture and useful household articles were made. One woman, for example, built an outside water cooler that she had wanted for years. It fitted outside a back window and was reached by raising the window and then the cooler door. It was large enough to hold, at Thanksgiving time, three turkeys, nineteen wild ducks, two wild geese, nine pies, three cans of carrot pudding, two cans of crab, one can of cranberry sauce, celery, lettuce, and other vegetables. One man built a table lamp, a corner cupboard, and a lounging chair. Bowls, end tables, lamps, and chests of drawers are among the interests of the members.

Individual needs guide the selection of articles to be built. Popular science and mechanical magazines serve as sources for ideas; many hints also are obtained from shop books on projects.

The facilities of the school should be available to all members of the community, and the school must become the center of more activities than it is at present. This class represents a start in this direction.—Gilbert Ewan, *instructor in the evening classes, Weed High School.*

Current Research in the Field of Secondary Education

Reviewed by WILLIAM A. SMITH

A Comparison of Learning Outcomes Following Activities Emphasizing Pupils' Self-Directed and Formally Guided Responses, by Zelma Langdon Huxtable. Unpublished Doctor's Dissertation, University of Southern California, 1937 (A. S. Raubenheimer, Guidance Committee chairman).

EDUCATION, along with other great professions such as medicine and engineering, is a double-headed monster. On the one hand, it involves an elaborate system of practices, and, on the other hand, a system of guiding principles commonly referred to as the philosophy of education. The component parts of the great San Francisco Bay Bridge were constructed mainly ashore. When assembled, they are reported to have fitted admirably. Why? Because the system of principles underlying the practice of engineering consists of tested and verified knowledge.

Up to the beginning of the present century the principles underlying the practice of education were almost entirely in the nature of philosophical assumptions, and the range of these has subsequently been appreciably extended by a coterie of brilliant thinkers. Concurrently, there came into being a movement to test such assumptions and to give us by degrees a body of scientifically verified principles as a guide to practice. In this more than anything else lies our salvation and hope as one of the great emergent professions. The import of the investigation reviewed below goes far beyond the immediate findings. It lies primarily in the scientific approach elaborated and successfully employed in dealing with a controversial issue in education which no amount of panel discussion or argument could have touched.

THE specific problem which Mrs. Huxtable set out to solve was: "Do pupils learn more effectively when left to their own devices in an educative environment than when they are guided formally by authoritatively determined values? Is one method inherently superior to the other? What is the psychological explanation?"

The investigation was carried on at the Thomas Starr King Junior High School in Los Angeles, where the investigator served at the time as a member of the teaching staff. Pupils participating in the experimental set-up were drawn from the A8, B9, and A9 grades in "integrated social studies and English" classes, the experimental learning situations being, however, incidental to, rather than a regular part of, the work of these classes.

The general set-up involved three experimental learning situations, namely: vocabulary, reading (comprehension and interpretation of social science materials), and composition (judgment of pupil compositions followed by creative writing). Each situation was selected for its "general and practical value to the learner." One hundred and four pupils, closely comparable in mental age, participated in the first two learning situations. The rotation-group technique was employed, thus "effectively"

eliminating "every variable except the approach to learning." Participation in the third learning situation was, for pertinent reasons, confined to two closely equated groups of forty-five pupils each. These were kept parallel throughout the experiment.

The several learning situations were carefully defined at the outset as to objectives and learning activities. A clear-cut distinction was drawn between the two learning approaches—one stressing pupils' self-directed responses and the other, pupils' formally directed (teacher dictated) responses to the learning situation. For example, in the case of the vocabulary learning situation the self-directed group was free to employ any one of several learning procedures which had been informally discussed in advance, or an entirely novel one; in the case of the formally directed group, on the other hand, the pupils were required to look up the words in the dictionary, to learn the definitions, et cetera.

Mean pre-test scores were obtained by appropriate procedures for each learning situation in advance of any learning activities. At the conclusion of each of the several learning intervals the outcomes for each learning situation and each learning approach were measured by means of carefully constructed objective tests, and the gains computed.

When the gains for the two approaches to the several learning situations were compared, none of the critical ratios were found to be statistically significant. In other words, neither of the two approaches to learning was found to be significantly superior to the other.

One infers from the comment by the investigator, "The inconclusive nature of all the experimental results was extremely discomforting to the investigator when it was first discovered," that she had set out with the expectation of finding one of these approaches decidedly superior to the other. In the estimation of the reviewer, it is at this point more than anywhere else that Mrs. Huxtable reveals her sterling qualities as an investigator in quest of truth regardless of consequences. She accepts the findings, for the situations in question, and proceeds to account for them tentatively on the strength of extensive observations made in the course of the experiments and subsequently through analyses of records and interviews of pupils.

Without going into detail, we can summarize the data thus obtained as pointing in a remarkably consistent manner to one conclusion—namely, that the primary conditioners of learning are such factors as mental ability, mental set, emotional balance, and interest and felt needs rather than differentiated approaches to learning. To quote directly from the investigator's conclusions:

> The experimental findings implied unmistakably that the test of a good learning situation was not whether pupils were overtly directing their own responses, on the one hand, or conforming them to uniform subject matter requirements, on the other, but whether they were sufficiently interested in the learning activity to reconstruct or recreate more adequate behavior values in experience. . . . . This recreation of values in terms of individual capacity, felt need, and immediate mental set was unique . . . . for every personality. . . . . The new values partook of the unique, despite extrinsic learning devices to which the learner had been subjected, precisely because they fulfilled unique functions in individual experience.

Junior Colleges for Two More States

The states of Montana and Idaho recently have enacted laws authorizing the establishment of public junior colleges. Both states are planning immediate action in starting operations. More than half the states now have similar laws.

What's Happening in California Secondary Schools

Edited by AUBREY A. DOUGLASS

Language Difficulties of Spanish-Speaking Pupils.—Miss Mary J. Escudero, teacher of Spanish in the Claremont Junior-Senior High School, Los Angeles, has given particular attention to the difficulties of Spanish-speaking pupils. Some of these are listed here, with suggestions for instructional procedures. Miss Escudero writes:

Bilingualism tends to retard students for three reasons: (1) The Spanish-speaking student has difficulty in adjusting his very relaxed vocal organs to utter sounds which require considerable tensity. This is usually enough to cause delay in scholastic achievement. (2) The bilinguist possesses two vocabularies, which generally he handles with unequal facility. He is able to discuss certain subjects with accuracy in one language, but he may be utterly incapable of discussing the same subject in the other language. Ability to conquer subject matter is thus affected. (3) Most Spanish-speaking students come from doubly humble homes—humble in culture (peon stock) and in tangible economic possibilities. As a rule, these features go together, but the frequency of exceptions is marked; there may be found, from time to time, very cultured families under very moderate and even meager economic existence.

Citizenship training becomes the foremost objective of education when applied to groups such as the one under discussion. In order to achieve the best results, Spanish-speaking pupils should attend classes with English-speaking pupils, especially in such courses as physical education, music, applied and domestic sciences, and so on. Here it is relatively easy for the student to lose all feelings of self-consciousness and self-restraint and to give vent to free speech.

In the Claremont school a period a day is devoted to activities designed to develop some means of overcoming the difficulties of these bilingual students. The basic content of this course has been English and Spanish. Most of the work is based on vocabulary building exercises in order to equalize the previously mentioned discrepancy in bilinguists' vocabularies. Minimum essentials of grammar are introduced wherever they become applicable to the work on hand. This is the usual routine, which is, however, often disregarded in order to clarify academic problems which the student may have encountered. In this class, also, many phases of contrast and similarity in the two languages are considered. The student learns how languages can be and are a means of self-expression. A pupil is encouraged to express himself as freely as possible, while his school companions listen attentively to offer comments and constructive criticisms.

Obstacles to the above procedures are summarized as follows: At first pupils resent the fact that they have been segregated, but when they see that the upper classmates of the preceding year are doing excellent work in Spanish

classes, resentment dwindles. The inability of the student to pronounce English is marked. Expressing one's thoughts in a written form becomes an arduous task, and expression in English is much more difficult than expression in Spanish. Under such circumstances, the pupil becomes discouraged. Only by exerting pressure and by searching for something new which may bring out his ability in the most conspicuous manner is the teacher able to bring back the student's eagerness to learn and his awareness to faults which he must correct. The teacher must always be ready to find the minutest positive qualities in each and every individual of the class. It should also be shown how these possibilities can be improved to produce more satisfactory results. The pupil should be made to realize that the knowledge of the two languages can become a tool for future success. This, together with the cultural heritage of the two languages, should give the pupil a live interest in this field of endeavor.

The course has helped in building up the morale of Spanish-speaking people. Heretofore, they have been in the lower percentiles when compared with other classes, but now since these pupils are assembled with others of similar accomplishments, they are likely to receive higher marks than they ordinarily do in regular classes. The following year, once their impediment has been more or less removed, pupils enter the regular second-year Spanish class. They are a great asset there because they are able to give English-speaking pupils the correct Spanish pronunciation. As a rule, they excel in knowledge and in achievement.

* * *

A Four-Year Citizenship Program at Livingston High School.—A course in freshman social studies was developed last year at Livingston High School, and already beneficial results are evident. The course is planned to serve as a basis for the development of a four-year citizenship program. As reported by Irma S. Morrison and Elizabeth R. Reynolds, the purpose of the course is to give every freshman orientation, personal adjustment, guidance, and citizenship responsibility.

When the course was begun, the freshman class was divided into five groups, all scheduled for the same period in the day. At the end of each six weeks each group was assigned to a new teacher. This system benefits student and teacher by offering a challenge to both. It necessitates a definite personality adjustment throughout the school year, due to the changes of class groups. And it enables each teacher to specialize in a particular unit of instruction.

The first six weeks of the course were devoted to orientation of the student to the school. During the second six weeks, and each six weeks thereafter throughout the school year, each group worked on one of the following units: group responsibility including safety and the effects of alcohol and tobacco from the social point of view, manners and behavior and how to study, occupations, personal development and use of leisure time, and personal finance and salesmanship. A unit was assigned to each of five teachers and was presented to each of the groups.

Guidance in choice of subjects and course of study as well as in scholarship accomplishments for each group of pupils is the responsibility of the teacher of each first group. Since there are five groups and six grading periods, each group of pupils returns to its original teacher during the last six weeks. Each teacher has the group, therefore, which he advises at the beginning and at the end of the year.

The awareness of citizenship respon-

sibility on the part of the student has been an underlying theme. An effort has been made to anticipate situations and prepare the students for them. For example, prior to the Freshman Reception, instruction was given in social dancing and social conduct. This party offered an excellent opportunity to the student for participation in organizing, planning, and managing a group activity. Class meetings provided practice in parliamentary procedure and self-expression in deciding issues and problems confronting the freshman class as a whole.

In order to make the course more flexible it was thought inadvisable to use a text. As a result, reference books dealing with the subject matter of the course were placed in a reserved section of the library. This section has been in charge of a student library committee which has changed membership every six weeks, thus enabling many students to obtain library experience. Each group has spent its class period one day a week in the library for reference work in preparation for reports. Many magazines, periodicals, and pamphlets have been used to enrich and enliven the course.

The unity of the course has been maintained by close coöperation between the participating teachers. These teachers, as a committee, have met at intervals to exchange ideas in an effort to develop and improve the course.

* * *

Los Angeles Principal Makes Suggestions for Reducing Tension in School.—The following paragraphs are taken from a mimeographed bulletin issued by R. D. Wadsworth, principal of the University High School, Los Angeles:

In a school developing a realistic program of instruction which works to preserve the individuality of its pupils by operating a live guidance program, opportunity must be made for its teachers to sort and re-sort instructional materials and human material as well. To get the time to do this in the traditional machinery of a large modern high school is a serious problem. If teachers are to maintain vigorous health, school organization must be continuously reshaped and practices shaken off which are time-consuming but of questionable value. To prevent overworking willing teachers, to eliminate strain, and to encourage the best in teaching, useless tension producers should be removed wherever possible.

Following is a list of suggested practices to relieve teacher tension. These and many more are now in use at University High School:

Set bell schedule, either regular or assembly program, two or three days ahead and stay with it.

Reduce class interruptions; eliminate useless bells. Principal should not be able to call an assembly at will, disturbing plans of all teachers.

Condense routine information in bulletin. Eliminate useless faculty meetings. Combine faculty meeting with Parent-Teacher Association meeting if possible. Interpretation of department aims with pupil participation good for both faculty and parents.

Small group faculty meetings during school day on teachers' free periods get 100 per cent coöperation from the teachers.

Eliminate home room as a separate period. Attach duties to regular recitation period which is lengthened five minutes.

Compiling of report-card information spread over more than one day makes teacher day easier.

Do not require teachers or students to attend assemblies. The daily bulletin gives information regarding type of assembly. Do not require teachers to sit with a group of students or to take attendance. Invite all. Student government and administrators assume responsibility for assembly order. Do not assign seats to students. During assemblies students may not leave grounds. They may go to the library or study hall or work in classrooms. Teacher-pupil conferences may be held. Adult sponsorship of students required during school day.

Lunch hour should be lengthy (62 minutes or more). Leisurely passing time between classes (7 minutes or more). Teachers agree that this is the best of all devices to lessen tension. Slowing tempo of school encourages more deliberateness in the "break up" at the end of periods of instruction. Particularly is this important at the end of the day. For the

many automobile drivers there is little rush in getting away from the curb.

Insuring musical instruments through reduced rates afforded by a joint school and student insurance policy is a tension remover for pupils, parents, and teachers. Covers loss by theft or breakage in transportation between home and school or in either place.

Teacher tensions resulting from pupil transportation problems, the private automobile especially, can be materially reduced by an automobile registration, safety patrol, and "check up" of drivers' licenses. Transporting students to neighboring schools for an athletic contest need not produce unusual worry if students are guided by route sheets, caravan route is supervised by safety patrol, and time factor for trip is liberally gauged. The unsafe, wild driver can be eliminated from the school neighborhood.

* * *

California High Schools Introduce Fused Courses in Physical Science. Within recent years there has been a strong tendency toward a physical science course that combines materials from physics, chemistry, and allied sciences. In the high school such courses have appeared most commonly on the eleventh-year level.

In order to determine just how far this movement had developed in the high schools of California, Donald R. Watson of the Citrus Junior College sent a postcard questionnaire last year to all high schools in the State. There were 328 replies, of which 116 indicated that such a course was being given last year in their school. This means at least 25 per cent of all high schools in the State were offering such courses. When the size of the enrollment is considered, the results show that better than 46 per cent of the pupils of the high schools of California were attending schools last year where a course in fused physical science was offered.

Most of the schools that gave such a course indicated that it had been recently established, only nine stating that it had been begun prior to 1934 and sixty-one that it had been set up in either 1937-38 or 1938-39.

When the schools offering courses in fused physical science were grouped according to their enrollments in grades ten, eleven, and twelve for last year, the following distribution was obtained:

Size of School	*Number of Schools*	*Per Cent of Total Group*
0– 199	20	17.2
200– 399	25	21.7
400– 599	15	12.9
600– 799	8	6.9
800– 999	13	11.2
1000–1199	7	6.0
1200–1399	2	1.7
1400–1599	4	3.4
1600–1799	5	4.3
1800–1999	1	.9
2000–2199	2	1.7
2200–2399	2	1.7
2400–2599	4	3.4
2600–2799	1	.9
2800–2999	1	.9
3000 and up	6	5.2

The figures show that the movement toward fused physical science in California high schools is not confined to the larger schools, for these classes have been introduced in schools of all sizes.

It seems significant that over half of the 116 schools that offered such courses in 1938-39 had an enrollment for grades ten, eleven, and twelve of less than 600 pupils while about 70 per cent of all high schools in the State fall within this range.

* * *

Boys' Physical Education at the California Junior High School, Sacramento. — The physical education program at the California Junior High School, Sacramento, according to Instructor Harry Coleman, has as one of its major objectives the training of the boys in social living. To accomplish this purpose, work in the physical education classes is carried on between teams. Some boys are given an opportunity for leadership by being selected for team captains; others learn to be good followers by being members of the team.

The opportunity for advanced leadership training is given to a selected group

of high-ninth boys through a Physical Education Monitors' Club. Boys who qualify for membership in this club report to the gymnasium during their study periods instead of going to the study hall. These students handle all the equipment of the sports and act as junior officials for all sports played at school. Monitors are given preparatory training before taking over their duties and continue to receive special instruction at their weekly club meetings. Such student help in handling gymnasium classes became necessary as the enrollment increased. A typical class schedule of seven basketball games and three touch football games in one period indicates the need for specially trained junior officials.

To prevent taking boys out of their regular physical education periods, thereby depriving them of their own activities, the Monitors' Club was organized with boys who are scholastically able to devote their study hall period to this work. This group of specially trained junior officials is also invaluable in conducting the extensive intramural program which takes the place of the recently suspended interschool athletic program.

The intramural program includes the popular seasonal sports and is conducted on the school grounds after school. The unit of competition is the homeroom. Each homeroom selects a student intramural manager who, in coöperation with the teacher, selects the teams for each sport. The classification of each player and the entries are determined in cooperation with the physical education instructors. All competition is between classified teams, as in the regular education classes. Leagues are formed to further separate the ages of the competing boys.

All intramural sports are conducted on the "round robin" plan, which allows each team to play several times regardless of "wins" or "losses." Posted schedules and records keep the students informed at all times of games played and games to be played.

Facilities are available to play as many as twelve touch football games or eleven basketball games at one time. With so many games going on at one time, the intramural program becomes an important school-wide activity. Recently an experiment has been conducted by which the members of the homerooms are able to be present at scheduled occasions when their homeroom teams are playing. This has developed more "game spirit" at the games. This plan also gives the homeroom yell leader a chance to lead his group in this popular activity and leads to a more unified spirit in each homeroom.

Last year, for the first time, the school published an intramural handbook. It contained the information necessary for the organization and understanding of the intramural program. The book will be a necessary part of each student's equipment, since it will contain the classification chart, information on how to organize a homeroom team, when and how certain sports are played, school songs and yells, and other information necessary to the student.

* * *

School Farm Helps Boys to Learn Farming.—The Tulare Union High School, with an enrollment of 222 boys in Vocational Agriculture and Agricultural Mechanics this fall, is looking for considerable help from the new school farm for vocational and practical experience.

The farm crops to be grown on the 48-acre tract reflect the agricultural income of the county: 18 acres of alfalfa, 12 acres of milo, 4 acres of cotton, and 6 acres of grapes. A farm superintendent and family on the tract will raise enough home food crops to be nearly self-sufficient.

It is planned to have the boys do much of the planting and harvesting. Bunkhouses will be built on the place to facilitate the opportunity for boys to do the regular chores. Most of the stationary equipment was placed on the farm during the summer and includes the superintendent's homestead, a pressure water system, an implement shed, stock corrals and shelters, and a 500-bird poultry unit. A team of brood mares, pure-bred Hampshire sheep, pure-bred Guernsey cattle, and Hampshire hogs have been purchased.

The school says of the purpose of this farm: "In teaching the students how to farm successfully by actually doing the necessary operations, emphasis will be laid on the use of improved practices and proper and economical farm management. All students will participate during the class period.

"If it is time to cull the poultry flock, the students will be taken to the farm and allowed to help in the operation. The same thing will apply to vaccinating, castrating, ear-marking, dehorning, and the hundreds of other farm jobs which the student wishes to learn in order to do the same thing efficiently on his own ranch or in his own home project."

Freshmen will start with small spring garden plots, through which they will learn valuable lessons in preparation of seedbeds, cultivation, harvesting, and, later, record-keeping and general management. The school farm will be a laboratory for the sophomore boys in animal husbandry practices and ultimately will be a management problem for senior students as they progress.

* * *

Teaching and Current World Conditions. — In a bulletin entitled "Teaching and Current World Conditions," Superintendent Vierling Kersey outlines a point of view and makes suggestions for Los Angeles teachers. While the significance of the publication cannot adequately be gained from one or two extracts, the point of view is indicated by the following sentences:

In many instances direct study of world problems today will definitely take precedence over routine consideration of subject matter, for in addition to pursuing a regular program of study, unexpected, impressive, and extraordinary issues of the world's problematic condition will be bound to appear for consideration. We may just as well recognize that all of us must be prepared to give some regular and organized study and instruction in connection with current happenings.

Naturally, teachers will choose to keep their own personal reactions to the present situation in the background. Any teaching which centers around personal reactions, personal feelings, or personal points of view will, and properly so, be criticized as propaganda. The teaching of facts and the dissemination of truth based upon all of the facts which it is possible to secure is as far as a school can go, for, after all, children in a democracy must think for themselves.

Teachers will strive to help students think clearly and fairly. Teachers will endeavor to protect from thoughtlessness or unfair comments any of their students who belong to less favored, to minority, or to attacked groups. There is a point of view, a loyalty, and an attitude that grows out of the American way of life, the American way of government, and the American way of tolerance. We shall be intolerant of any other than the American way as reflected in the keenest, most alert analysis of what is best for our country—first, last, and always.

It is suggested that, with the exception of some very important occurrence, current events in the war crises be summarized or brought up-to-date not more often than once a week. Military activities and current events of warfare, losses and advances especially, should not be overemphasized. There is no reliable source of information and frequently no two sources will agree. It will be better to focus attention on causes of war, influences on neutral nations, implications for the future, and desirable attitudes for constructive thinking. It will be practically necessary for teachers constantly to develop for themselves and their pupils adequate backgrounds and understandings of current events. If there are those who are not thoroughly equipped with a broad understanding and complete background, distinct care in any statement should be exercised.

CALIFORNIA SOCIETY OF SECONDARY EDUCATION

INCORPORATED UNDER THE LAWS OF CALIFORNIA AS A NON-PROFIT ORGANIZATION

OFFICERS

L. P. FARRIS.....*President*
FRANK W. THOMAS.....*First Vice-President*
JOHN ASELTINE.....*Second Vice-President*
L. M. PERRY.....*Secretary*

Office Address: Rooms 9-10, Haviland Hall, Berkeley, California

EXECUTIVE BOARD

ETHEL PERCY ANDRUS
ARNOLD C. ARGO
JOHN ASELTINE *(ex officio)*
L. P. FARRIS *(ex officio)*
WALTER R. HEPNER
GEORGE C. JENSEN
ALBERT C. OLNEY
HERMAN A. SPINDT

FRANK W. THOMAS *(ex officio)*

BOARD OF TRUSTEES

ETHEL PERCY ANDRUS, Principal, Abraham Lincoln High School, Los Angeles.

A. C. ARGO, District Superintendent, Sequoia Union High School, Redwood City.

JOHN ASELTINE, Principal, San Diego Senior High School.

J. WARREN AYER, Superintendent of Schools, Eureka.

GEORGE J. BADURA, Principal, Fortuna Union High School.

GRACE V. BIRD, Dean, Bakersfield Junior College.

A. R. CLIFTON, County Superintendent of Schools, Los Angeles.

A. J. CLOUD, President, San Francisco Junior College, San Francisco.

MARVIN L. DARSIE, Dean, Teachers' College, University of California at Los Angeles.

WILLIAM F. EWING, Assistant Superintendent of Schools, Oakland.

L. P. FARRIS, Principal, Oakland High School.

ARTHUR GOULD, Deputy Superintendent of Schools, Los Angeles.

JOHN W. HARBESON, Principal, Pasadena Junior College.

WALTER R. HEPNER, President, San Diego State College, San Diego.

CAROL HOVIOUS, San Benito County Junior College and High School, Hollister.

O. S. HUBBARD, Coördinator of Secondary Curricula, Santa Clara County, San Jose.

ROSCO CHANDLER INGALLS, Director, Los Angeles Junior College.

GEORGE C. JENSEN, Principal, Senior High School, Sacramento.

J. R. MCKILLOP, District Superintendent of Schools, Monterey.

ALBERT C. OLNEY, President, Marin Union Junior College, Kentfield.

J. R. OVERTURF, Superintendent of Schools, Palo Alto.

HERMAN A. SPINDT, Manager of the Bureau of Guidance and Placement, University of California at Berkeley and Los Angeles.

ALICE BALL STRUTHERS, Principal, Thomas Starr King Junior High School, Los Angeles.

FRANK W. THOMAS, President, State College, Fresno.

GEORGE C. THOMPSON, Principal Emeritus, Alameda High School.

EX-OFFICIO HONORARY MEMBERS OF BOARD OF TRUSTEES

WALTER F. DEXTER.....State Superintendent of Public Instruction

AUBREY A. DOUGLASS, Chief of Division of Secondary Education, State Dept. of Education

CALIFORNIA SOCIETY OF SECONDARY EDUCATION

INCORPORATED UNDER THE LAWS OF CALIFORNIA AS A NON-PROFIT ORGANIZATION

SUSTAINING MEMBERS OF THE SOCIETY

MILTON NEWMARK, Attorney at Law, Crocker Building, San Francisco.

CALIFORNIA TEACHERS' ASSOCIATION:

Bay Section: Albert S. Colton, President, Herbert Hoover Junior High School, Oakland; E. G. Gridley, Secretary, 2163 Center Street, Berkeley.

Northern Section: James N. Gardner, President, C. K. McClatchy Senior High School, Sacramento; Mrs. Portia F. Moss, Secretary, Auburn.

LIFE CORPORATE MEMBERS

(Limited to 100. Fee $50.00)

DR. ETHEL PERCY ANDRUS, Principal, Abraham Lincoln High School, Los Angeles.

ARNOLD C. ARGO, District Superintendent, Sequoia Union High School, Redwood City.

R. F. ASPINALL, Principal, Edison Technical Junior High School, Fresno.

WAYNE F. BOWEN, Compton City Schools, Compton.

DR. H. B. BROOKS, Principal, George Washington Junior High School, Long Beach.

CAPT. DELBERT BRUNTON, Sanger.

ARCHIBALD J. CLOUD, President, San Francisco Junior College, San Francisco.

WILLIAM F. EWING, Assistant Superintendent of Schools, Oakland.

DR. L. P. FARRIS, Principal, Oakland High School, Oakland.

HARVEY H. FERRIS, Principal, Weed High School, Weed.

DR. LOWELL C. FROST, Head of Science Department, Beverly Hills High School, Beverly Hills.

GEORGE H. GEYER, District Superintendent, Westwood Junior-Senior High School, Westwood.

ROBERT R. HARTZELL, Principal, Red Bluff Union High School, Red Bluff.

ANNIE G. HARVEY, General Science, Washington Junior High School, Fresno.

DR. WALTER R. HEPNER, President, San Diego State College, San Diego.

CLARENCE G. HERKNER, Principal, San Rafael Grammar School, San Rafael.

DR. C. L. HUGHES, Assistant Professor of Education and Assistant Director of Practice Teaching, University of California, Berkeley.

ZELMA L. HUXTABLE, Teacher of Senior Problems, Phineas Banning Junior-Senior High School, Los Angeles.

FERDINAND J. LAPEYRI, Teacher of Arithmetic and Shop, High School of Commerce, San Francisco.

J. R. MCKILLOP, District Superintendent of Schools, Monterey.

RHODA MCRAE, Teacher of Social Studies, Roosevelt High School, Oakland.

ATTILIO G. PARISI, Attendance Officer, Central Junior High School, Los Angeles.

F. J. PRIBBLE, Director, Commercial Education, Sacramento Junior College, Sacramento.

DR. WILLIAM M. PROCTOR. (Deceased.)

JESSE E. RATHBUN, Teacher of Woodwork and Mathematics. Presidio Junior High School, San Francisco.

HORACE M. REBOK. (Deceased.)

DR. LESTER B. ROGERS, Dean, School of Education, The University of Southern California, Los Angeles.

MARJORIE NICHOLS SHEA, Vice-Principal, Abraham Lincoln High School, Los Angeles.

LEE ROY SMITH, Vice-Principal, San Fernando High School, San Fernando.

DR. ALICE BALL STRUTHERS, Principal, Thomas Starr King Junior High School, Los Angeles.

RUTH G. SUMNER, Teacher of Algebra, Oakland High School, Oakland.

DR. FRANK C. TOUTON. (Deceased.)

HELEN E. WARD, Principal, Salinas Evening High School and Junior College, Salinas.

DR. FREDERICK J. WEERSING, Professor of Education, The University of Southern California, Los Angeles.

DR. HERMAN P. WINN, Teacher of Mechanical Drawing, Phineas Banning Junior-Senior High School, Wilmington, Los Angeles.

TEN-YEAR TERM CORPORATE MEMBERS

(Sale of Ten-Year Term Memberships discontinued July 1, 1934)

J. WARREN AYER, Superintendent of Schools, Eureka.

A. R. CLIFTON, County Superintendent of Schools, Los Angeles.